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A FORTNIGHTLY REVIEW
OF THE
IMPERIAL DEPARTMENT OF AGRICULTURE FOR THE WEST INDIES.



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VOLUME V.

JANUARY TO DECEMBER 1906.

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A FORTNIGHTLY REVIEW OF THE IMPERIAL DEPARTMENT OF AGRICULTURE FOR THE WEST INDIES.

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Permanent Exhibition Com- mittees.

IN the last issue of the *Agricultural News* (p. 397) there was published a copy of a letter from Messrs. Pickford & Black, of Halifax, relative to the Exhibitions proposed to be held

in the Dominion of Canada during the year 1906. The Annual Fair at Toronto, held in permanent buildings in an attractive park, is largely attended, on some days as many as 90,000 to 100,000 passing the gates. In addition, there is the Dominion Exhibition, assisted by the Central Government and patronized by manufacturers and others throughout the Dominion and the United States. In 1906 this Dominion Exhibition is to be held at Halifax.

The dates of the Toronto and Halifax Exhibitions have been arranged so that the former Exhibition will be closed in ample time to enable the exhibits to be transferred and shown at the Dominion Exhibition at Halifax.

Messrs. Pickford & Black are of opinion that these Exhibitions would form an excellent means of placing the products and resources of the West Indies before the Canadian public, and they offer to assist by carrying all exhibits from the West Indies to Toronto and thence to Halifax free of charge. They also undertake to arrange for the necessary space and the proper showing of the exhibits. The exhibitors would thus only have to provide the exhibits and pay a share of the cost of erecting booths or stalls for their accommodation.

It is pointed out that only bona fide samples of commercial products should be forwarded to these exhibitions, namely, such articles as are likely to lead to the maintenance and development of trade between the West Indies and the Dominion of Canada.

Messrs. Pickford & Black add, in regard to the

previous exhibition in which they took so active a part, that nothing has ever been done which has so effectually brought the resources of the West Indies before the people of Canada.

This opinion is endorsed by all who are conversant with the subject, and there can be no doubt that it would be to the advantage of these colonies to avail themselves fully of the offer made by Messrs. Pickford & Black and place the West Indies in a prominent position at both the exhibitions above referred to.

We have recently had a very successful exhibition of West Indian produce at the Colonial and Indian Exhibition in London, and in connexion with this the West India Committee and its indefatigable Secretary deserve great credit. There is to be a Colonial Products Exhibition at Liverpool from January 30 to February 8 next, and there are one or more exhibitions of Colonial Fruit to be held during 1906 by the Royal Horticultural Society.

At all such exhibitions, it is the duty of the West Indies, if they are to keep abreast of the times, to be well represented. It is not so much a question of money as of efficient organization and taking advantage of the simplest and best means for attaining the end in view. Usually, when a proposal to send exhibits to an exhibition is brought before any of the colonies, the first question asked is: Where is the money to come from? The reply is: We have no money. This is regarded as final, and the matter is dropped.

The only way in which an efficient and economical representation of the products of these colonies can be provided for is by the appointment of Permanent Exhibition Committees. This has been frequently urged in the *West India Committee Circular* and it has received the cordial support of the Imperial Department of Agriculture.

The present is a favourable time for the appointment of such committees, for it is the implicit belief of the best friends of the West Indies that it is only by such means that their agricultural, mineral, and manufacturing resources, of which, unfortunately, too little is known either in the United Kingdom or the Dominion of Canada, can be fully realized.

It is suggested that the subject might be brought forward for consideration by the Agricultural and kindred Societies in the West Indies, and that a recommendation to appoint a Permanent Exhibition Committee in each colony be submitted for the

approval of the Government. If the proposal be approved, it would be desirable that sums varying from £20 to £100, according to local circumstances, be placed on the estimates for 1906-7 to meet the incidental expenses connected with packing and forwarding exhibits.

By such means the necessary machinery for dealing with exhibits offered in each colony would be ready at hand and no time would be lost in waiting for the appointment of Committees or for the money required to cover the cost of packing and transport.



SUGAR INDUSTRY.

The West Indies and the Canadian Sugar Market.

The following note in regard to West Indian sugar in the Canadian market is extracted from a report in the *Montreal Herald*, of November 8, of the proceedings at the meetings of the Canadian Tariff Commissioners, a body of three members deputed by the Dominion Government to inquire into the working of the customs' tariff:—

Mr. Russell Murray, representing the Imperial Department of Agriculture for the West Indies, appeared in support of a requisition in favour of concessions in the sugar tariff which would benefit the West Indies.

According to the tariff at present in force the duty chargeable upon sugar of all classes over 16 Dutch standard is nearly double that of sugar under 16 d.s. Sugars of 89° when under 16 d.s. pay a net duty of 41c. per 100 lb., and for sugar above 16 d.s. the net duty is 73c. In crystallized sugars of 96°, or under 16 d.s., the net duty is 47c. and for 96° crystal, over 16 d.s., the net duty is 80c. The 16 d.s., which is the dividing line, has the effect of excluding from Canadian consumers a very large quantity of grocery sugars which are not produced in Canada and therefore are not in competition with any Canadian productions. In order further to develop the Canadian trade, he submitted that the raising of the standard should be considered and that it be raised from 16 d.s. to 19 or 20 d.s., on the existing basis of duty.

This would admit, at a lower rate of duty, semi-refined sugars, grades of yellow sugar which were now practically excluded but which were largely used in Great Britain.

Mr. Fielding observed that a change in the standard such as advocated, would bring some of the lower grades of sugar into competition with the refined sugars in the market.

Mr. Murray admitted that this was probable. He also asked that molascuit, a product of the debris of ground sugar, upon which there was a duty of 20 per cent., should be placed on the free list. It was an ingredient used for the manufacture of stock food.

In reference to the above, a correspondent writes:—

If Mr. Russell Murray can get his proposal through, it would be a great boon to the Barbados sugar planters, as they could then ship to Canada centrifugal muscovado sugar which would go direct into competition without having to be refined.

In support of what I have said above, I may mention that a few days ago I received a letter from Messrs. W. H. Millman & Sons, to whom I had sent a small consignment of 12 tons of vacuum-pan sugar on October 31 last, asking if I could send them a car-load of from 12 to 15 tons of soft, dry muscovado sugar, as they had had several inquiries for sugar of that description.

The Influence of Soda Salts in the Soil on the Composition of Sugar-cane.

The *International Sugar Journal*, for December 1905, contains a valuable paper by Mr. H. C. Prinsen Geerligs, of Java, on the above subject, in which it is shown that while the sugar-cane will assimilate soda only as a last resort, yet the presence of such salts leads to various combinations with potash, lime, and magnesia, placing these at the disposal of the plants. The following information is extracted from Mr. Geerligs' paper:—

It is a remarkable fact that sugar-cane grown on a salt soil contains an exceedingly small amount of soda salts, even in those cases where these canes are rich in chlorine. Cane can thrive very well on land which does not contain any chlorine salts at all, which proves that it does not need those salts for its development. If, however, cane is planted on land which is salty owing to its vicinity to the sea shore, or from any other reason, the analysis of the juice of such cane shows a large amount of chlorine; but then this constituent is not combined with soda but with potash. The aim of the investigations, which are set forth in this article, was to examine in what way the chlorine, which was first combined with soda in the soil, was absorbed by the plant in combination with potash.

The analysis of a large number of samples of Java molasses and molasses from other countries, among which such were chosen as were from places originally near the sea, indicated that a high chlorine content always coincides with a high amount of potash, while the amount of soda is always insignificant, although the chlorine had originally occurred in combination with that element.

The analyses of cane juice from various experimental plots with fertilizers of every kind equally show a well-marked preponderance of the potash salts above the soda salts in the juice.

From all these analyses and data it has become evident that sugar-cane has a predilection for potash, while assimilating as little soda as possible, to such an extent that where an abundance of sodium chloride exists in the soil, the cane takes only the chlorine, whereupon it is no longer combined with the soda but with potash. In this case this potash must have been present somewhere, and hence there is no doubt that that element had been present in the soil as a silicate and had been transformed into potassium chloride. In other words, there was a mutual interchange between the elements of sodium chloride and potassium silicate, forming potassium chloride and sodium silicate.

The data recorded prove that sodium chloride dissolves large quantities of lime, magnesia, and potash from the soil, but no phosphoric acid.

In connexion with the experiments mentioned in this paper there will doubtless exist countries where the mineral substances of the soil are so firmly combined and so difficult to be assimilated that it is an advantage to be able to dissolve them with so cheap an ingredient as salt water, and it is very probable that Phipson and Hanson are right for Jamaica and Demerara in advocating manuring with salt for sugar-cane. But the fact cannot be generalized, and in Java, for instance, I should not advise the manuring with salt, as in the Java soil the potash is so readily available that all experiments with fertilizers made in the last twenty years have proved unanimously that an increase in the soluble potash in the soil by manuring with potash fertilizers did not improve either the tonnage of the cane or its sucrose content.

PROMOTION OF AGRICULTURE IN PORTO RICO.

The following is extracted from the *Experiment Station Record*, of the U. S. Department of Agriculture, for November 1905:—

Press reports state that the establishment of a Bureau of Agriculture for Porto Rico is in contemplation. The University of Porto Rico, at Rio Piedras, near San Juan, has a 100-acre farm which the trustees propose to use for illustrating improved methods and for giving students practical training in agriculture. There is now a class of twenty-eight such students. The present herd of twelve cows is to be doubled, and a model dairy installed. The institution is now selling its milk to people in the neighbourhood, and with the new equipment it is proposed to handle and put up this milk according to the most modern sanitary methods. An attempt will also be made to improve the dairy stock by the importation of a blooded bull from this country.

Thorough-bred swine are also to be introduced, and three stallions. One of these stallions will be kept at the University, one at the Experiment Station, and the other at some convenient point on the south side of the island. Slips sufficient for the planting of 100 acres of sisal will arrive within a short time and will be distributed to persons who wish to experiment with the growing of this fibre plant. In numerous ways the propaganda for the improvement of conditions will be carried on with the co-operation of the Federal Experiment Station at Mayaguez, whose pioneer work has paved the way for this more popular work about the island.

THYMOL.

Thymol is prepared from ajava or ajowan seeds produced by *Carum copticum*, which is extensively cultivated in India. This is a small plant belonging to the natural order *Umbelliferae*. In their *Semi-Annual Report* (October-November 1905), Messrs. Schimmel & Co. state:—

'The cheap period of this article has now passed. The prices of ajowan seed have advanced about 40 per cent.; the supply is also limited, and it is difficult to obtain large parcels. Under these circumstances no firm offers for thymol can be made at present, but each case must be dealt with on its own merits. Thymol must be protected from light and heat, and is best kept in yellow bottles.'

As has been stated in the *Agricultural News* (Vol. IV, p. 202), thymol has been successfully used in the West Indies for worms in horses.



WEST INDIAN FRUIT.

PINE-APPLES IN THE BAHAMAS.

The following information relative to the pine-apple industry in the Bahamas is extracted from the *Annual Report* on the colony for 1904-5:—

The pine-apple crop this year is good, and the fruit of good size, but there has been a falling off in recent years which has caused anxiety, and it is universally acknowledged that something must be done to improve the cultivation of the fruit and methods of planting, and to ascertain what fertilizers are most wanted.

Great hopes are entertained that the pine-apple industry may be saved with the aid of scientific methods, especially since the canning industry has so largely superseded the export of raw fruit, and the fruit is reckoned superior to that of other countries for the purpose of packing and tinning.

Pine-apple canning is taking the place of the export of fruit, and the Nassau factory of the J. S. Johnson Co. exported 47,973 cases, consuming 15,329 dozen pine-apples, and giving employment to 300 persons weekly. At Governor's Harbour, Eleuthera, the canning factory worked for forty days, and filled 22,450 cases, consuming 10,000 dozen pine-apples, and giving employment to 150 persons daily.

WEST INDIAN LIMES.

The following note appeared in the *West India Committee Circular*, of December 8, 1905:—

A feature of the exhibition of colonial fruits, to which reference is made on another page, was the display of West Indian limes, and cards bearing the following inscription in bold type were placed about the West Indian section:—

'For all purposes for which lemons are now used, West Indian limes are infinitely superior. The delicacy of flavour, aroma, and juiciness of West Indian limes are such as to make them instantly preferred by those who have used limes and lemons. Moreover, West Indian limes come from our colonies and the bulk of the lemons now in this country come from foreign parts. Support the colonies and give West Indian limes a fair trial.'

'The rind is so thin, and the pips so few and small, that the lime is practically a globe of juice, yielding more for its size and weight than the lemon, while the flavour is delicious.' The *Grocer*, August 19, 1905.

It will be of interest to our readers to know that we are continuing to receive many inquiries regarding this luscious fruit. As a result of the Colonial Exhibition we were successful in placing them in many of the largest hotels and restaurants in London, and repeat orders for from five to ten boxes continue to be received almost daily.

Too much stress cannot be laid upon the fact that only carefully selected, evenly graded and well-packed fruit should be sent, as the market requires most careful nursing, and the despatch of badly packed and poor fruit is liable to give it a set-back. There is no doubt that the taste for West Indian limes is increasing and that it is capable of immense development. The chief difficulty so far experienced is with the greengrocers who have tried to sell the fruit without explaining where it comes from, what it is, and what purpose it serves, and it is hoped that the notice above referred to will prove helpful in this connexion.

ROYAL HORTICULTURAL SOCIETY'S SHOW OF COLONIAL FRUIT.

The following is an extract from the report in the *Gardeners' Chronicle*, of December 9, 1905, on the Royal Horticultural Society's Show of Colonial Fruit, held in London on December 5 and 6:—

The West Indian Section of the Exhibition was organized by the West India Committee, which utilized many of the exhibits that formed part of the display lately shown at the Crystal Palace. The collective exhibits occupied the whole of the west side of the hall facing the entrance. Messrs. James Philip & Co., 4, Fenchurch Buildings, E.C., displayed a group of miscellaneous products, ranging from cigars to pickles. They had West Indian fruits in dried, crystallized, bottled, and sweet-meat form. We noticed yams, oranges, limes, sugar, cordials, wines, pickles, sauces, mangos, shaddocks, and a host of other such like things, the majority of which are rarely seen in our grocers' shops. (Silver Gilt Knightian Medal.)

The Royal Mail Steam Packet Company showed a number of fresh fruits—bananas (including the claret-colored variety) avocado pears, limes, papaw, citrons, also bottled specimens of sour sop, guavas, christophines, peppers, etc. (Silver Gilt Knightian Medal.)

The British West Indian Fruit Company, Ltd., showed bunches of bananas and tropical fruits preserved in bottles. The Hon. J. Cox Fillan, Dominica, was awarded a Silver Banksian Medal for a display of limes.

From Grenada came spices, cacao, cotton, and bottled fruits. Dominica sent fruits of the colony, including limes, shaddocks, grape fruit, etc.

Jamaica showed tobacco in the manufactured state, including cigars, also sugar and a cattle-food made from the waste products of the sugar industry named molasses. From Barbados came sugar, rum, molasses, cotton, pickles, and other preserves, etc. Messrs. McDoddies and Co., Finsbury, E. C., showed desiccated vegetables.

GRAPE FRUIT.

The following extract, containing information respecting the grape fruit in England, is taken from the *British Medical Journal*, of November 25, 1905, (pp. 1,419-20), kindly communicated to this Department by Dr. John Hutson, of Barbados. We may remind our readers that full information in regard to the origin, cultivation, and the extended use of the grape fruit in the United States is contained in a recent number of the *West Indian Bulletin* (Vol. VI, pp. 284-92), a brief summary of which appeared in the *Agricultural News* (Vol. IV, p. 357):—

As a result of the more rapid service of steamers instituted by the enterprise of Messrs. Elder, Dempster & Co. between this country and Jamaica, it is possible to obtain the fruits of the latter island in a fresher condition than has hitherto been the case. One kind of fruit which can now be readily bought in London deserves wider recognition and adoption for its healthful and delicious qualities, this is, the grape fruit, a variety of the *Citrus aurantii* * group, looking, in fact, like an exaggerated orange or small melon. From inexperience in selecting and preparing the fruit for eating, many persons who have essayed it are not enthusiastic, and it has not won the approval which it assuredly deserves. This is because the fruit is often sold and eaten in an unripe condition and without preparation. The fruit is gathered in Jamaica while the rind is still green, but when it arrives in England the colour is a light-yellow; it may acquire some dark-ringed facettled marks, which are the result of pressure, during transit, † and are of no importance. The fruit should be of a doughy softness, and its surface should pit slightly when pressed with the finger. It should be prepared by dividing it into two hemispheres, by cutting it across in a horizontal plane at right angles to the axis of the 'navel.' In each hemisphere thus produced will be seen a white, pithy core, surrounded by white seeds like those of the common orange. Core and seeds should be freely cut away with a small, sharp knife, leaving a conical depression or pit into which the juice speedily flows. It should be prepared some hours before it is required to be eaten, in order to allow the juice to fill the cavity, and powdered sugar should be poured into the hollow according to individual tastes; in warm weather a lump of ice put into the hollow adds to the refreshing effect. The fruit is eaten by scraping with a small spoon at the sides of the pit, and mixing the segments of fruit with the juice in the pit. In Jamaica and in the United States, where the fruit is very popular, it is usually eaten at breakfast and as a *hors d'œuvre* at lunch; but it is equally palatable as a dessert. It has a wholesome, clean, slightly bitter taste, blending with the acidity of the orange, and has the physiological action of stimulating the appetite and promoting salivary and gastric digestion.

* The grape fruit and forbidden fruit do not belong to the oranges but are regarded by recognized botanical authorities as varieties of the pumelows or shaddocks (*Citrus decumana*).

† The facettled marks referred to are not the result of pressure in transit but to pressure during growth on the trees. The name grape fruit is derived from the French *grappe*, a bunch, as the fruits are usually produced in clusters resembling a bunch of grapes, as shown in fig. 24 on p. 357 of Vol. IV of the *Agricultural News*. The facettled marks are sometimes fancifully referred to as the prints of Eve's fingers, hence *forbidden fruit*. Usually the name 'grape fruit' is confined to the globular fruits and 'forbidden fruit' to the pear-shaped forms.

COLLECTING PARA RUBBER SEED.

The following is extracted from the *India Rubber Journal* of November 20 :—

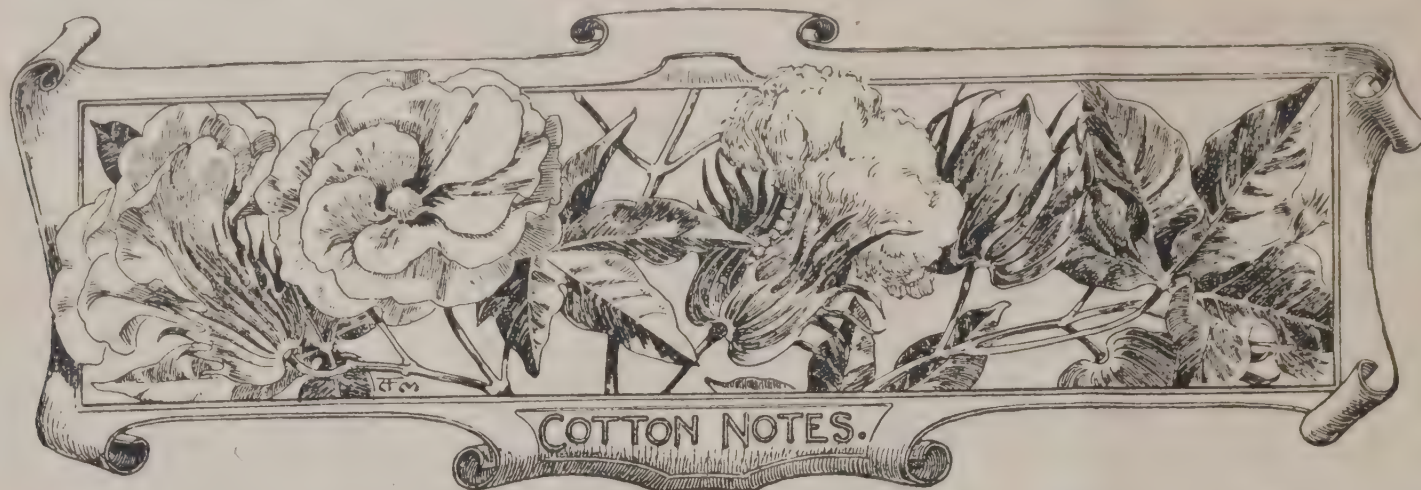
Kepitigalla estate, Matale, has long been known as a source from which reliable Para seed in first-class condition could be obtained. A representative of the *Times of Ceylon* recently gave the following description of the method of dealing with this seed. He writes that on the estate, besides the tappers and their assistants, there are women collecting the seeds, which are constantly falling, under the trees. Every now and then one heard the crackling sound of the shells bursting, followed by the falling of the seed. The estate has done well during the past year out of seed alone, 6,250,000 having been sold. Of course, a large number have been used on the estate. The seeds that are not collected germinate and spring up under the shade of the larger trees, and after a short time they are transplanted. A great deal of the planting on the estate has been done in this way. One of the rooms in the factory was nearly all taken up by the seed. The seed is brought in by the women in bags and emptied into three large cisterns in the cement flooring. One of these is dry, and from this the seeds are packed for sending away to purchasers. Mr. Holloway, who is full of resource and ideas, here again has a system of his own for packing. The seeds in the boxes or sacks are mixed in a certain preparation, which preserves them. A box was opened in which the seeds were placed on August 14. About fifteen seeds were picked at random from this and all, except one, on being opened, were found to be perfectly good. In the other cisterns referred to water is sprinkled over the seeds at frequent intervals and they are left until they germinate. This is done by one or two coolie women who pick out the seeds as they germinate and place them in baskets ready for planting.

FENCES AND HEDGES.

Leaflet No. 147, recently issued by the Board of Agriculture, London, is devoted to the subject of hedges and fences for farms. The subject is, of course, discussed from the point of view of the British farmer, and the leaflet deals with the formation of hedges with thorn, holly, beech, etc., but the following extracts are of general interest:—

One of the difficulties with which landed proprietors, farmers, and others interested in estates have to contend is the formation and maintenance of hedges and fences. This difficulty is often increased on estates, where everything is done to keep the fences in good order, by neighbours who own boundary fences paying little or no attention to their maintenance.

The way in which hedges are trimmed determines both their shape and stability. Dress with an upward stroke, make the hedge wedge-shaped, and never be in haste to raise the hedge to its full height; these are rules which must be observed to ensure success. Hedges which have been raised too rapidly are often unable to act as a fence owing to the weakness and looseness of growth. Fences which are trimmed regularly for many years sometimes get, in spite of attention, so unshapely and unnecessarily large, that ribbing-in, or cutting back the lateral growth to the main stem is desirable to bring them back to their former shape, and also cutting back to the base all surpressed or weekly stems to encourage growth. Adjoining pastures this operation is rather risky unless the fence is protected for a time.



COTTON PROSPECTS AT ST. VINCENT.

The following is an extract from a letter from the Agricultural Superintendent, St. Vincent, to the Imperial Commissioner of Agriculture for the West Indies, dated December 9, 1905:—

Cotton prospects continue bright, and I expect to have seed-cotton equal to upwards of 90 bales of lint stored at the factory by the end of next week.

A good sign is the adjusting of the picking business. Last season considerable difficulty was experienced in getting labour to pick the cotton, but this season the difficulty has almost disappeared. One planter, who had trouble from this cause last season, tells me that people are leaving other work to pick cotton this season, and had he known this earlier he would have put in a much larger acreage. The three or four small growers who planted this year are getting excellent returns and will do well. This fact is also encouraging.

ANTIGUA COTTON GINNERY.

The Hon. Dr. Francis Watts has addressed to the Colonial Secretary, Antigua, a report on the working of the cotton ginnery in that island. The following information is extracted from this report:—

The Antigua cotton ginnery having now been at work for two seasons, a time sufficiently long to have carried the work beyond the experimental stage, it appears desirable to review the position.

The ginnery was opened by Lady Edeline Strickland on December 11, 1903, and has ginned 155 bales (of 200 lb.) for the crop of 1903-4, and 304 bales (of 180 lb.) for the crop of 1904-5.

The equipment of the ginnery is as follows:—

There are two single-action roller gins and one double-action, converted into a single-action gin. During the first season the ginnery was run by means of a portable steam engine lent by the Government of Dominica: for the second season's work a petroleum engine (Cundall type) was substituted and has worked very satisfactorily. Two hand-power baling presses are in use, and a plunger press for the production of bags, of the Sea Island type, has been erected, but not yet used. A disintegrator, with self-feeding and bagging attachments, is provided for seed crushing.

The full cost of ginning a pound of lint has been 1.1497d., or 9s. 7d. per 100 lb. The charge for ginning has hitherto been 1½d. per lb. of lint (12s. 6d. per 100 lb.).

In view of the above facts, I propose to make a reduction in the charge for ginning, but, in order to reduce the trouble in collecting accounts, I propose that this reduction shall be by way of discount for prompt payment.

It is probable that, in future, the cost of working may be cheapened as the result of experience, but I see little justification for the reduction of the charge of ginning below that stated above. It is to be remembered that the cotton has been ginned, baled, shipped to the British Cotton-growing Association, and accounted for without any trouble on the part of the owner.

Proposals have been made for handing over the business of the ginnery to a local company, if a suitable company can be formed. The foregoing affords a basis for the discussion of terms. As matters now stand, I think it will be best, in the interest of the industry, for the ginnery to be worked under Government management for another season; but I see no reasons why immediate steps should not be taken to endeavour to form a company to acquire the business as soon as the crop of 1905-6 has been dealt with.

COTTON CROP AT ST. KITT'S.

The following interesting report on the cotton industry at St. Kitt's has been communicated by Mr. F. R. Shepherd, the Agricultural Superintendent in that island:—

I have the honour to report that on December 12, I paid a visit of inspection to the estates growing cotton on the leeward side of the island, viz., West Farm, Stone Fort, Wingfield, Lambert's, and Con Phipp's.

The factory at Stone Fort was ginning, and although the wind was light the aermotor was working and the gins were doing good work. Seventeen bales of 240 lb. each had been ginned up to date. At Wingfield estate the cotton fields were full of ripe cotton and about 100 women and children were to be seen picking in one field. The return from this estate will be over the average, and I was pleased to find that the damage done by the worm had not in any way affected the yield of cotton. On this estate the cotton is planted rather wider apart than is the custom, the trees being 5 feet by 4 feet. At Lambert's the yield is not so good, but yet better than last year, and the cotton in store was well sorted and of a good character. At Con Phipp's, the greater portion of the crop has been picked and there were some 30,000 lb. of seed-cotton in store ready to be ginned.

On all these estates the cotton is being grown as a catch crop, and as the first picking is over, the trees are cleared off to get the land ready for cane. The leaf-blister mite could be seen on some of the older trees, but generally speaking the condition of the field was healthy.

I am informed that the factory at Spooner's will start ginning on December 18, and shipments of this season's cotton will soon be made. Samples of some of the cotton grown this season have been forwarded by this mail to Mr. E. Lomas Oliver.

AGRICULTURAL INDUSTRIES OF ST. VINCENT.

The *Annual Report* on St. Vincent for 1904 (dated August 30, 1905) has the following review of the agricultural industries of the island:—

There has been some advance made during the year under this head.

The demand on the Agricultural Department for the supply of economic plants was very considerable, and from the returns it is evident that an appreciable area is being planted in cacao and other permanent crops.

CACAO INDUSTRY.

The export of cacao was 742 bags, as against 443 in 1900, and in the absence of any further set-back the figure should in a few years rise to beyond what it was (1,500 bags) before the disastrous hurricane of 1898.

It should be noted, too, that a considerable quantity of cacao is consumed locally by the peasantry, and it is therefore a product of great importance to the community.

COTTON INDUSTRY.

The cotton prospects are also encouraging, though disease occasioned loss in some localities, and the total yield in comparison with the acreage in cultivation was, in consequence, disappointing.

The cotton-ginning factory was opened on January 4 last, and up to March 31, 222,262 lb. of seed-cotton had been ginned, giving 171 bales containing 61,011 lb. of lint.

In quality the cotton left little to be desired, and an all-round price of 1s. 5d. per lb. was realized.

St. Vincent, indeed, is in the position of having produced the highest-priced cotton in the empire, and as a result, there has been a great demand for the St. Vincent seed, large quantities of which have been disposed of at a satisfactory price, after undergoing careful selection and disinfection at the hands of the agricultural officers.

DEVASTATED AREAS.

In the areas devastated by the eruption, on the Leeward side, one of the estates has changed hands, and a commencement has been made in re-starting cultivation. On the Windward side, the Carib country estates, with the exception of Mt. Bentinck, are still untouched, save for the reaping of a considerable quantity of ratoon cane, which, having had vitality enough to survive the effects of the volcanic blast, has now sprouted and thrown up luxuriant stools.

Large areas of land on these estates are still, however, no more than a cinderous waste, and in an ascent which I made to the summit of the Soufrière crater in April last for the purpose of observing conditions, I was much struck by the havoc wrought by water, as well as the depth and uncompromising consistency of the scoriae, and the consequent difficulties and expense that must be attendant on any attempt at systematized cultivation.

LAND SETTLEMENT SCHEME.

No further lands were acquired under the Land Settlement Scheme, attention being rather directed to securing a fuller and more beneficial use of those already taken up and given out in allotments. The services of the Agricultural Instructor in this direction continued to be of great use. Over 15,000 economic plants, mainly cacao, were distributed; the wind-break system was proceeded with and instructions were given, by direction of his Excellency the Governor, as

to the preparation and maintenance of compost manure heaps, compliance with which has been insisted on under regulations which give the requisite power.

Considerable improvement has also been effected in the matter of the approaches to the allotments and the roads connecting with the acquired estates, a special sum from the fund having, on my representations, been approved by the Secretary of State for this object, with due provision for annual expenditure on upkeep so as to ensure a state of permanent fair repair.

AGRICULTURAL SHOW.

An agricultural show—the second—was held on March 9 under the auspices of the Imperial Department of Agriculture, at which the exhibits showed considerable advance in number and quality, but the success of the day was, unfortunately, somewhat marred by the weather.

INOCULATION FOR ANTHRAX.

The following information in reference to the inoculation of cattle and small stock by means of anti-anthrax serum has been furnished by Mr. R. A. Stoute, D.V.S., Consulting Veterinary Surgeon to the Imperial Department of Agriculture for the West Indies:—

In reply to your letter No. B. 5,569 of the 12th. instant, I am pleased to be able to inform you that any reliable firm of druggists either in London or in Paris would be able to supply Sclavo's anti-anthrax serum.

Pasteur's serum may be obtained from Messrs. C. H. Huist & Co., 12, Red Lion Square, London, W.C., and the Pasteur Vaccine Co., 366, West 11th. Street, New York. The cost of the above varies, but it is usually at a cost of about \$5 for sufficient to inoculate fifty oxen or 100 sheep.

In using the serum it is advisable to obtain a hypodermic syringe of sufficient size to contain four doses for cattle, or eight for sheep. The syringe is fitted with a screw so that the size of the dose may be regulated. The serum must be used as soon after it is obtained as possible, the tubes to be kept closed till ready for use; they are well shaken, opened, and at once drawn in the syringe, which has been disinfected. As soon as the injection is made, the thumb is placed over the hole made by the point of the syringe and the spot gently rubbed with the other hand.

Sheep are injected under the skin of the right thigh, while oxen are injected just behind the right shoulder for the first and behind the left for the second serum. The hair must be clipped from the part. Very young animals or those that are in an advanced stage of pregnancy should not be subjected to the serum inoculation.

Great care must be taken in handling the serum, as it may be quite possible to introduce the disease; and for the same reason animals in any district in which the disease has not made its appearance should never be treated with serum. The immunity produced usually lasts for about one year.

An interesting communication on the subject of anthrax inoculation from Dr. C. W. Branch, of St. Vincent, was published in a recent issue of the *Agricultural News* (Vol. IV, p. 318). Dr. Branch gave information relative to the use of the vaccines of Pasteur, Sclavo, and Sobernheim.

EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming, should be addressed to the Commissioner, Imperial Department of Agriculture, Barbados.

All applications for copies of the 'Agricultural News' should be addressed to the Agents, and not to the Department.

Local Agents: Messrs. Bowen & Sons, Bridgetown, Barbados. *London Agents:* Messrs. Dulau & Co., 37, Soho Square, W., and The West India Committee, 15, Seething Lane, E.C. A complete list of Agents will be found at foot of page 3 of the cover.

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Agricultural News

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NOTES AND COMMENTS.

Contents of Present Issue.

The editorial in this issue of the *Agricultural News* deals with the establishment of permanent exhibition committees in the West Indies, with the view of securing the adequate representation of these colonies at the principal exhibitions in the United Kingdom and Canada.

An effort is being made in Canada to secure concessions in the sugar tariff that would benefit the West Indies. This is dealt with in a note on p. 2. Following this is a note of some practical, as well as scientific, interest on the influence of soda salts in the soil on the composition of the sugar-cane.

A further note appears on p. 4 in reference to the efforts that are being made to popularize West Indian limes in England. On the same page is a brief description of the West Indian section at the show of colonial fruit recently held by the Horticultural Society.

Under the head of 'Cotton Notes' will be found references to crop prospects in St. Vincent and St. Kitt's, and information as to the working of the Antigua cotton ginnery.

An interesting review of the agricultural industries of St. Vincent is reproduced on p. 7 from the *Annual Report* on the colony. A similar review for the island of Carriacou will be found on p. 15.

Arbor day was celebrated on a fairly large scale at Antigua on November 9. A summarized report of the proceedings appears on p. 13.

West Indian Fruit Trade.

In a recent letter from the Sales Department of the British West Indian Fruit Co. Ltd., the Manager writes:—'Wherever an attempt is made to start a banana industry the chief point to be insisted on is "quality." The markets here are flooded with inferior fruit which sells at low prices; but for the very finest fruit good prices are obtainable. The same remarks apply to the orange trade.'

Agriculture in St. Vincent.

Elsewhere in this issue is published an extract from the *Annual Report* on St. Vincent for 1904-5 dealing with the agriculture of the island. The following notes on the exports of St. Vincent are taken from the same source.

Increases are noticeable in the value of the exports of sugar, molasses, and syrup, the total value being £11,177 against £3,309 in the previous year. There are also increases in vegetables and other general produce and live stock, which tend to show a better condition of things among the peasantry.

The value of the exports of cotton and cotton seed, during the second year of the revival of the industry in St. Vincent, was £4,857, as compared with £200 in the previous year.

The prospects of the cotton industry are thus very encouraging, and it is also gratifying to observe that an appreciable area is being planted in cacao and other permanent crops. The output of cacao appears to be steadily increasing.

Cotton Prospects at St. Vincent.

A brief note on the prospects of the St. Vincent cotton industry appears elsewhere in these columns. Further evidence of the satisfactory nature of these prospects is to be found in an editorial in a recent issue of the *St. Vincent Times*. 'On all sides,' it is stated, 'we hear of improved yields.' After giving several instances, the article continues: 'It is exceedingly gratifying to be able to record the above facts for they will have an important effect on the circulation of money in the colony, and have already created among many small proprietors, an incentive and a determination to devote as much land to cotton next season as their means will allow.'

Cotton growing is being taken up by the small proprietors as well as the large landowners, and it is anticipated that the exports from St. Vincent next season should more than double the present record.

In this connexion interest attaches to the reference made in the *Annual Report* on the colony for 1904 to the encouraging prospects of the cotton industry. This is reproduced on p. 7. Although, in that year, the total yield was somewhat disappointing on account of the prevalence of disease, 'in quality the cotton left little to be desired, and an all-round price of 1s. 5d. was realized.'

Royal Botanic Gardens, Kew.

Papers to hand from England by last mail contain the announcement of the retirement of Sir W. T. Thiselton-Dyer, K.C.M.G., C.I.E., F.R.S., from the Directorship of the Royal Gardens, Kew. Sir William has held that appointment since 1885 and for ten years before his promotion he was Assistant Director under Sir Joseph Hooker, G.C.S.I., C.B., F.R.S.

The new Director of Kew is Lieutenant-Colonel David Prain, M.B., LL.D., of the Indian Medical Service, Director of the Botanical Survey of India.

Norbrook Nurseries, Jamaica.

A list of plants and seeds for sale at the nurseries and gardens of Norbrook plantation, Constant Spring, Jamaica, has been issued by the proprietor (George Loutrel Lucas). Everything sent out from the nurseries is guaranteed 'to be true to name, free of insect pests, and healthy.'

Plants in large quantities are carefully crated and delivered on board steamer, purchaser to pay freight which must accompany all orders. At least six months' notice must be given when large quantities of such plants as coffee, cacao, nutmegs, cocoa-nuts, etc., are required.

As the proprietor of Norbrook has for some years been a successful grower of pine-apples, interest attaches to the following list of varieties of this plant, suckers and slips of which are always available: Abbaka, Black Jamaica, Curaçoa, Egyptian Queen, Red Spanish, Green Ripley, Red Ripley, Sam Clark or Ruby, Smooth Cayenne, Sugar Loaf, and others.

Castilloa Rubber in Jamaica.

The *Jamaica Daily Telegraph*, of December 13, contains two interesting letters on the growing of *Castilloa elastica* in Jamaica.

The first letter, from the pen of the Hon. Wm. Fawcett, reviews briefly the discussion which took place at the last West Indian Agricultural Conference on rubber cultivation in the West Indies. On that occasion Mr. Fawcett pointed out that in Jamaica, in three different localities, none of which could be considered moist situations, *Castilloa* grew without any shade. At Hope Gardens, with a rainfall of 53 inches, *Castilloa* trees were planted; some in good soil under guango trees (*Pithecolobium Saman*), some near by so as to get a certain amount of their shade, and some in poor, very dry soil, without shade. The shade was fatal. Those planted in the poor, dry soil without shade have demonstrated what a hardy tree the *Castilloa* is. The experiments further show that, even with a small rainfall, *Castilloa* will thrive wonderfully if irrigation is available or if the soil water is near the surface.

Mr. Joseph Shore also relates his experiences with *Castilloa* trees at Cinnamon Hill, near Montego Bay, with an average rainfall of 34½ inches. He says:

'I have seen no plant that can stand a dry climate on a light soil better than the *Castilloa*.' Some trees were planted under shade of the guango, others in the open. The former did not thrive at all, and the shade was removed, whereupon they started a vigorous growth. A few hundred more trees were planted last year, and all are doing well in the open, on light soil, in a district with only 40 inches annual rainfall.

Agriculture in Lagos.

It is stated in the *Annual Report* on Lagos for 1904 that the value of the exports of palm kernels was £113,000 more than in 1903. The exports of palm oil were practically unchanged.

In regard to other products, there were striking increases in the exports of maize, cacao, cotton, and rubber. It is regarded as very desirable that the colony should not be entirely dependent upon the palm tree, and the extension of the trade in other products is therefore very gratifying.

The efforts of the British Cotton-growing Association to extend the cotton industry, which have met with a certain amount of success, are assured of the hearty support of the Government. The value of the ginned cotton exported during 1904 was £12,330.

Attention is drawn in the report to the shea tree (*Butyrospermum Parkii*) as an indigenous product, at present almost neglected, from which substantial benefit might be derived in the future. It is also pointed out that there are good prospects in the planting up of kola trees for the produce of which there is a large local demand, the value of the kola nuts imported during the year being £40,000.

Agriculture in the Gold Coast.

Reference to the tables of exports in the *Annual Report* on the Gold Coast for 1904 shows that rubber is the most valuable agricultural product of the colony. A gradual increase has been maintained in this product since 1901. The quantity exported during 1904 was 4,013,837 lb., of the value of £360,644. The Para rubber tree appears to be the most satisfactory rubber-producing plant to cultivate in the Gold Coast, and steps are being taken to procure further supplies of seed from Ceylon and the Straits Settlements.

The export of cacao, both in quantity and value, was more than doubled during the year. The cultivation of this product has now been taken up in practically every district of the colony.

The trade in kola nuts has shown a steady improvement since 1902, the total value exported in 1904 being £54,763.

The further decrease in the output of palm oil and palm kernels is attributed to the exceptionally small rainfall, and partially to the substitution of cacao on some of the plantations.

The outlook in connexion with the cotton-growing industry is promising in the Eastern Province, where the area cultivated has increased from 200 to 2,000 acres in the last two years.



INSECT NOTES.

Beetle attacking the Cotton Worm.

In a letter to the Imperial Commissioner of Agriculture, forwarding for identification a beetle that feeds on the cotton worm, Mr. H. G. S. Branch, of Barbuda, states that these beetles feed greedily on the cotton worm and on the chrysalis, seeming to prefer the latter, the inside of which is eaten out clean, leaving only the empty shell. The beetles have been kept for ten days in a box and fed with cotton worms. They are to be found only in the portions of the field infested by the worms, and when the worms are gone the beetles disappear. Mr. Branch believes that some of the beetles are killed by eating the poisoned worms.

The Entomologist on the staff of the Imperial Department of Agriculture, to whom the specimen and letter were referred, reports as follows:—

The beetle received from Mr. Branch is *Calosoma calidum*, a well-known predaceous beetle of North America. It has been known as an active enemy of the cotton worm in the Southern States and of the gypsy moth caterpillar in Massachusetts.

It is a general feeder and seems to attack almost any species of caterpillar.

The beetle is about 1 inch in length and $\frac{1}{2}$ inch in width, greenish-black in colour, with brighter green reflections from the wing covers. Six rows of distinct bronze spots run lengthwise of the wing covers. The mandibles or jaws are large, the antennae slender, and about half as long as the body.

The occurrence of this insect in Barbuda is of especial interest, as it does not seem to have been previously recorded from the West Indies, and is the first beetle reported to this Department as attacking the cotton worm in these islands.

Cotton Insects in West Africa.

In *L'Agriculture Pratique des Pays Chaud*, for November, there is given a list of insects found on the cotton plants in French West Africa. Many of these are similar in habit to the cotton pests known in the West Indies, while others are different.

The roots and stems are attacked by a small species of the family Buprestidae (*Sphenoptera* sp.). The entire life-cycle is spent in the cotton plant, both larvae and adult beetles boring through the wood of the stem and roots and causing the death of the plant.

Two species of flea beetles attack the leaves (*Nisotra dilecta* and *Nisotra uniformis*) and two Lepidopterous caterpillars (*Rigema ornata* and *Sylepta derogata*) attack the flowers and young pods. A small, green plant louse lives on the back of the leaves, and three species of ladybirds are found on the cotton which seem to be the natural enemies of this plant louse. These are *Cydonia vicina*, *Chilomenes lunata*, and *Chilocorus* sp.

Several species of grasshopper feed on the leaves of the

cotton, but are not partial to this plant, attacking it only incidentally, or when a field of cotton lies in the line of march of a migrating swarm. One species (*Pachytylus migratorioides*) completely destroyed a field of cotton near Segou last year.

A small, red caterpillar (*Earias insulana*) eats out the inside of the unripe pods and causes a considerable reduction in the amount of the crop.

Many other insects are mentioned, but they seem to be of less importance up to the present time. Among them are *Nezara viridula*, the common green bug of the West Indies, and a species of *Dysdercus*.

Mealy Bug on Bananas.

The following note is extracted from the report in the *Gardeners' Chronicle* of a meeting of the Scientific Committee of the Royal Horticultural Society held on November 21:—

From Las Palmas came specimens of an insect which 'attacks both plant and fruit of bananas, particularly the latter, at the time of the rainy season, when it seeks shelter from the rain between the fruits and eats its way into the fruit.' Mr. Saunders said 'The insect is one of the "mealy bugs," probably *Dactylopus citri*. Paraffin emulsion will kill these insects, but how is this or any other insecticide to be applied effectually to clusters of bananas? It might be possible to tie the bunches of fruit up in bags and then introduce hydrocyanic acid gas by means of a tube from some vessel in which the gas was generated.'

Ant Heaps.

Reviewing a paper by Mr. H. Ingle, in the *Transvaal Agricultural Journal*, Vol. 3, no. 12, the *Experiment Station Record*, for November 1905, has the following note:—

Analyses of ant heaps and of surrounding soil are reported which 'indicate much greater fertility in the ant heap material than in the soil on which it occurs. The organic matter and nitrogen are particularly noticeable, the latter being more than four times as abundant in the ant heap, while the "available" potash and phosphoric acid are also much higher.' These analyses, as well as the experience of a number of practical farmers which is recorded, indicate that 'pulverized ant heaps might with advantage be used as a manure on poor soils, and should be of great value in gardens, for seed beds, etc., provided that their physical properties—fine texture, etc.—do not render them too close and impervious.'

CEYLON COCOA-NUT TRADE.

An article in the *Bulletin of the Imperial Institute* has the following note on the Ceylon cocoa-nut trade:—

The exports of the produce of the cocoa-nut palm in 1903 represented over a quarter of the total value of Ceylon produce, the value being nearly 26,000,000 rupees (£1,730,000). The most valuable product is the oil, followed, in order of their importance, by copra, desiccated cocoa-nut, poonac, and coir. The bulk of the oil goes to the United Kingdom, America, and India, and the copra chiefly to France and Germany, where the oil is expressed. England and Germany are the principal consumers for the coir rope, yarn, and fibre.



SCHOOL GARDENS IN ST. LUCIA.

In his report on the primary schools of St. Lucia for 1904, the Inspector of Schools (Mr. C. F. Condell) makes the following reference to school gardens:—

It has been impossible for me so far to pay as much attention to the school gardens as I should have wished, since during my Acting-Inspectorship I was seldom able to leave Castries. From those I have visited, I am inclined to think that the primary object of their establishment, that of agricultural instruction, has been in very many cases lost sight of. In a number of gardens the boys seem merely to busy themselves with the raising of ordinary market vegetables or common flowers, such as they could cultivate just as well under the direction of their parents. This may be partly the cause of the strong objection some of the parents appear to have to their children working in the gardens. I have been given to understand that several children have been removed from one of the Castries schools, which has a good school garden, and sent to another which has none, for this reason.

Children who work in a school garden should, when working in their own plot, be able to show their parents that they have learnt something these latter did not know before.

The bee colony at Choiseul appears to me a really useful and practical experiment. I think it would be a step in the right direction if each school adopted a special kind of cultivation, suited to its district, and made a careful study of this alone.

Appended to this report is the report of Mr. G. T. Cumberbatch on the annual examination of the schools, from which the following is extracted:—

Some very fine school gardens were seen by me, and I could have seen others to better advantage, had not the season, during which my inspection took place, been the dry one. Where the soil was humid and the means of obtaining water easy, gardens naturally flourished; but where the above conditions were not favourable, they, on the contrary, suffered. There were many gardens well laid out, hedged in and properly cleaned, but having no plants to speak of in them on account of want of rain; it was hard fairly to estimate the merits of the teachers and pupils of such schools at a single visit. More attention should, however, be paid to pot culture and the establishing of nurseries, so as to give pupils a better idea of the growth and gradual development of plants generally. In connexion with these gardens a prize of £5 was offered by the Agricultural Society for the best garden in the island. The society, at my suggestion, instead of a single prize, very liberally awarded three prizes of £5, £4, and £3 each to the three schools possessing the three best gardens. These prizes were won by the Castries Anglican Juvenile, the Saltibus Combined, and the Vieux-fort Boys. The first-named school has a really fine garden with over fifty different kinds of plants, has water turned on in the middle of the garden, and is conveniently situated near the public market. The head teacher, Mr. Warrican, is an enthusiastic agriculturist. Good work was generally done in questions on the theory of elementary agricultural science. I was generally satisfied with the attention paid to, and the results obtained from, the study of this useful branch of education.

SISAL HEMP IN THE BAHAMAS.

The value of the exports of sisal hemp from the Bahamas during the year 1904-5 was £29,557, against a value of £38,805 in the previous year. The *Annual Report* on the colony has the following reference to the industry:—

The factories for extracting sisal fibre are much more numerous and usually stand in the midst of the fields in which the plants are growing.

The following are a few interesting particulars of the present condition of this industry:—

The J. S. Johnson Co. have two factories and two machines for extracting and cleaning fibre, have 2,500 acres planted and an output of 253 bales (about 46 tons).

Menendez & Co. have three factories, about 1,250 acres bearing, one Todd and one Villamor machine in use—output of 296 bales.

In the island of San Salvador there are two sisal factories belonging to the Bahamas Sisal Plantation with two Todd cleaning machines and two oil engines—output 351,700 lb.

At Abaco there is a factory belonging to Sawyer & Co., with two cleaning machines and an output of 32 tons of fibre, and at the island of Little Abaco one of the first established of the companies continues at work, making constant improvements, and has now 10 miles of railroad, two cleaning machines with an output of 160 tons.

There are also two factories at Inagua, and one at Andros Island, the latter having an output of 50 bales.

WEIGHT AND VALUE OF EGGS.

In reference to a note suggesting the purchase of eggs by weight, reproduced in the *Agricultural News* (Vol. IV, p. 54) from the *Barbados Advocate*, the *Cyprus Journal* for November has the following:—

It is true that the ordinary *retail* trade in eggs is usually carried on by the sale at so much per dozen, instead of so much per oke [2.1 lb.], but the correspondent quoted was in error in stating that the sale by weight is nowhere practised. This method of selling eggs is now very generally adopted in the great egg-producing countries. The Danes, for instance, from whom we may learn so much of value in agricultural matters, have for a long time seen the advantage of selling in this manner, or rather the folly, from the producers' as well as the consumers' point of view, of selling by the dozen. A deputation from the Department of Agriculture in Ireland, which made a visit to Denmark in 1903, deals with this subject in their report in the following words: 'The eggs are purchased from the farmers by weight in bulk irrespective of size, and are then packed at the centre of that society. . . . The cases when packed are then despatched to one of the nine district packing stations, where the box is weighed gross, and again weighed when emptied, and the society which has consigned the eggs is paid by weight of the eggs received.'

This system, as stated above, is now recognized and practised in most European countries. As will be seen, however, the sale by weight is accompanied also by proper and careful grading, and thus purchasers can rely in great measure on getting eggs not only of good size but also of good quality.

This is one of the direct results of co-operation in agriculture, and until a practical, sustained effort is made to introduce this system into Cyprus, we shall probably continue to be deprived of these benefits which are enjoyed in other countries.



GLEANINGS.

According to the *Consular Report*, Zanzibar exported, during 1904, hippopotamus teeth to the value of £2,158, Bombay being the principal market.

The *Daily Mail* states that at the Royal Horticultural Society's show of colonial fruit on December 5 and 6 'the West Indies were represented by ripe, yellow bananas, oranges, and pine-apples.'

The Trinidad *Royal Gazette* of December 21, announces that the name of Professor P. Carmody has been entered in the Register of Patents as the proprietor of an invention for the destruction of parasol ants and other pests.

It appears from a note in the *Port-of-Spain Gazette*, of December 20, that there is a prospect of a plant being erected in Trinidad for the manufacture of chocolate and cacao butter.

According to the *Port-of-Spain Gazette*, 'it seems probable that the month of December will be recorded as a truly remarkable one, so far as cacao is concerned. Roughly speaking, we believe that last month's delivery was 7,000 bags in excess of that of November 1904.'

It is stated in the Report on the Trinidad Botanical Department for 1904-5 that the Litchie (*Nephelium Litchi*) produces fruit occasionally in Trinidad. The trees show no regularity in fruit production, intervals of over fifteen years between crops having been observed.

In the same report it is mentioned that the mangosteen also fruits at irregular intervals. The fruit produced in the Botanic Gardens is of excellent quality, and there is a great demand for young plants. It is hoped that some of the oldest raised during recent years will soon reach the bearing stage.

The total number of seeds and plants distributed through the two Botanic Stations in the Gold Coast during the year was 15,142 plants, 2,000 cacao pods, 8,500 lb. of cotton seed, 55,000 Para rubber seeds, and 942 packets of seeds (various). (*Annual Report* for 1904.)

The Secretary of State for the Colonies has informed the Imperial Commissioner of Agriculture that the Hydrographical Congress, which it was proposed to hold in connexion with the Colonial Exhibition at Marseilles next year (see *Agricultural News*, Vol. IV, p. 396), has been postponed until 1907, when it will meet at Monaco. It is still intended, however, that a section for 'Oceanography' shall be opened at the Marseilles Exhibition.

The twenty-fourth annual sale of Government Farm stock will be held at Valsayn, St. Joseph, Trinidad, on Friday, January 12, 1906, commencing at 1.30 p.m. The list comprises seventy-two head of pure and cross-bred cattle, mules, Tamworth and other pigs, poultry, ducks, bronze turkeys, geese, etc.

The *Annual Report* on Lagos for 1904 has the following: 'Large numbers of kola trees have been planted during recent years, some of which must be approaching maturity, and it is only natural to expect that a considerable and very profitable trade will result. At present the people are almost entirely dependent on imports for this article of food, which is considered in many places to be practically a necessity.'

An association has been recently formed in Trinidad under the name of the 'Cocoa Planters' Association of Trinidad.' All cacao planters have been invited to join the association and co-operate in a movement for the common good. The association is not a trading concern; its main object will be to induce planters to join together to make the best cacao they can.

According to the *Annual Report* on St. Vincent for 1904, 'A whale fishery which is a very material benefit to the inhabitants of the St. Vincent Grenadines, is carried on in those islands, notably Bequia and Canouan, but, unfortunately, in 1904-5 it was somewhat of a failure, and the value of whale oil exported was £437 only, as against £1,150 in the previous year.'

In their report of November 25, Messrs. G. P. Mitchell & Sons, Ltd., of Halifax, N.S., say that they cannot impress upon planters too strongly the great desirability of adopting the central factory system, as crystals will always find a ready sale, which is not the case with muscovado, the days of which, they fear, are numbered. (*West India Committee Circular*.)

The St. Lucia *Official Gazette*, of December 16, contains a copy of a proclamation to the effect that, upon the representations of the Imperial Commissioner of Agriculture, it has been decided to prohibit the importation into St. Lucia of any portion of the banana plant from Trinidad, where a somewhat serious fungoid disease (*Marasmius seminustus*) affecting banana plants is prevalent. Similar action has been taken in Grenada, St. Vincent, and other islands.

The *Annual Report* on the Gold Coast for 1904 has the following reference to the teaching of agriculture in the elementary schools: 'At a large number of schools there are plantations in which are grown cotton, cacao, arrowroot, corn, rubber, as well as vegetables and flowers. The chief difficulty is the want of trained instructors. A course of instruction is now given to teachers at the Government Botanical Gardens. Prizes are also offered to schools for the best farm or plantation.'

Mr. Sebert Evelyn, of Clapham plantation, Barbados, has drawn attention to a peculiarity in the arrangement of the hands on the stem of the Chinese or dwarf banana. He has noticed that the eighth hand is exactly opposite the first and suggests that this may be conveniently utilized in checking the number of hands on a bunch. Possibly the same arrangement is found in other varieties besides the Chinese or dwarf banana.

ARBOR DAY AT ANTIGUA.

The following is extracted from the report of the Arbor Day Committee at Antigua, kindly forwarded by the Chairman (the Hon. Dr. F. Watts, C.M.G.):—

Arbor Day was celebrated in the different districts of Antigua as in previous years.

St. John's.—At 8.30 a.m. a large gathering collected near the bridge to the east of the Botanic Station, which was gaily decorated with flags. After the National Anthem had been played by the band, his Excellency the Acting Governor opened the ceremonies by planting the first tree. Immediately afterwards, mahogany trees were planted by ladies in the Victoria Park along the Tomlinson's Road, thus continuing the 'Ladies' Avenue' started two years ago.

The children of Spring Gardens, Buxton Grove, and Ebenezer schools continued the 'Elementary School' Avenue, and the children of the Cathedral school planted trees near the Bishop's schoolroom.

The Grammar School boys planted seven mahogany trees and the girls of the High School five mahogany trees along the boundary of the Rectory grounds bordering on Hyndman's Village.

The students of Buxton Grove planted trees in Buxton Grove grounds. (Ten mahogany trees and one avocado pear.)

St. James'.—The school children assembled in the schoolroom at 8 a.m., where a short address was made to them on the subject of arbor day. The National Anthem was then sung, and the children marched out and planted seven trees on the road leading from the churchyard gate to the church. Each of the seven standards in the school promised to look after and care for a tree.

St. Luke's.—Four trees were planted round St. Luke's schoolroom, and fruit trees were distributed to peasants for planting on their own lands.

St. Paul's.—The celebrations were conducted at four different stations, English Harbour, Falmouth, Sweets, and Gracehill. The general plan of operations was to plant and protect four new trees at each station, and to replant as far as possible the old positions of the two previous years.

At English Harbour the trees in front of the Wesleyan Chapel were replaced. Four trees were planted on the English Harbour road. Mr. Odium also planted trees at suitable positions along the roads.

At Falmouth twenty-four trees had been planted on the two previous arbor days at the north end of the carriage drive to Falmouth Rectory. These had all died but were replaced by Mr. Tongo, and four new trees were planted at the other end of the drive.

At Sweets some ten trees had lived through the drought. The vacant holes were again replanted, and four trees were planted on the public road leading to St. Ann's.

At Gracehill, nine trees were alive, including three royal palms. The vacant holes were replanted, the tree guards mended, and four trees planted.

The children of the schools assembled at Sweets, English Harbour, and Gracehill, and sang the National Anthem before planting the trees. Over one hundred children were present at Sweets, and a large number at English Harbour and Gracehill. Several people in the district recognized the day by planting fruit trees in their own grounds. The peasants planted cocoa-nut and orange trees chiefly, while two or three were supplied with Christmas bush or bay trees (*Pimento acris*) from the Botanic Station.

All Saints'.—At 8 a.m. the school children and parishioners assembled in the schoolroom, where songs, addresses, etc., were given.

St. Philip's.—The ceremony of tree planting began at 7.30 a.m. At Willikies the school children planted four mahogany trees, and afterwards sang the National Anthem. Three royal palms were planted at St. Stephen's, and one at Collins' estate.

St. Peter's.—At 8.30 a.m. the ladies of the parish planted a number of trees round the grounds of the Antigua Country Tennis Club, and then joined in singing the National Anthem.

St. George's.—After a short service at the Mission Church, Sea View Farm, the school children planted twenty bay trees.

The children of St. Mark's school planted thirty-one walnut trees (*Andira inermis*) south of the parish church.

Eight walnut trees and a large number of white wood (*Terminalia buceras*) and Jamaica shade trees (*Pithecolobium saman*) were planted on the sugar factory lands.

SHEA NUTS.

Discussing the desirability of broadening the trade of the colony, the *Annual Report* on Lagos for 1904 has the following reference to a possible industry in the products of the shea tree (*Butyrospermum Parkii*):—

We have also an indigenous product which at present is almost neglected, but from which it is hoped that substantial benefit may be derived in the future, viz., the shea tree. This is not as a rule found within the palm belt, but immediately beyond there are great areas of country inside the Lagos boundary where it flourishes, and in which the natives have at present but little regular occupation. At the time of writing this report the question of finding some free and remunerative outlet for the produce of this tree is being pushed forward by the Government, which feels that there are good grounds for efforts in that direction, as shea nuts to the value of about £19,000 were exported from the Niger during 1904. Up to the present, the trees in Lagos have been only slightly worked in order that what is known as shea butter might be procured, there being a fair local demand for this commodity, but it is hoped that the shipment of nuts may give better results than have so far attended experimental shipments of a native-manufactured 'butter.' The attention of merchants at home who are interested in the Lagos trade is particularly directed towards this product, and their co-operation invited.

GROUND NUTS FOR FORAGE.

The results of growing ground nuts at the Arkansas Experiment Station are recorded in a recent bulletin. This crop has increased in popularity of late years in the Southern States. While the extension of ground nut culture for market purposes cannot be specially advised, in many localities the crop can be grown for forage and for purposes of soil renovation. In the Southern States the plants are generally loosened in the soil by means of a plough running sufficiently deep and constructed to cut the tap root without tearing the nuts from the vines. Later, the rows of vines are gathered into small cocks, and when partly wilted are stacked about poles and left to cure for from two to four weeks until ready for picking. The curing process is finished in the barns. According to numerous estimates, the yield of hay from a crop of ground nuts varies from 1 ton to nearly 3 tons per acre. The hay is usually worth at least \$10 per ton, and may be considered a by-product when the nuts are harvested.



SUGAR AND THE SUGAR-CANE: An elementary treatise on the agriculture of the sugar-cane and on the manufacture of cane sugar. By Noël Deerr. Altrincham, Manchester: Norman Rodger. 1905. pp. 396 and xix. Price, 7s. 6d. net.

The writer of this treatise has set himself the by no means easy task of attempting to present in one consecutive whole a general view of the cane-sugar industry, and it must be conceded that he has succeeded admirably.

In the course of twenty-four closely written chapters the whole subject is brought under review, beginning with the cane itself and passing in orderly succession to the soil and climate required for the sugar-cane, its varieties, manner of cultivation, irrigation, manuring, the diseases and enemies to which it is liable, its harvesting and transport. The various methods of extracting the juice and of manufacturing the sugar are described at considerable length and practically every machine used in a modern cane sugar factory is described, both as to its structure and use. The chemical control of the factory is discussed at length, the methods of working of analyses and calculations being fully described. The final chapter is devoted to the question of fermentation and the production of alcohol.

In the preface the writer points out that he lays little claim to originality, the work being largely a compilation of the extensive and scattered literature which now exists. This is a strong point, for, from the careful manner in which he has compiled the work of many well-known writers, he has left little to criticize, while laying all interested in the sugar-cane and the manufacture of cane sugar under a debt of gratitude for bringing together much valuable information which, formerly being scattered, was either difficult to trace or apt to be overlooked.

The book is copiously illustrated, and in addition to 120 figures in the text there are nine well-executed coloured plates of prominent varieties of sugar-cane.

In the attempt to describe the principal varieties of sugar-cane allusion is made to the almost hopeless confusion which exists in the naming of sugar-canes, a condition which threatens to grow worse with the production of new seedling varieties in various parts of the world.

The various operations in the preparation of the soil and the planting of the cane are considered in moderate detail, but this part of the work does not receive such full treatment as do the other parts dealing with the transport of the cane and the manufacture of sugar. This is perhaps only natural, for the great diversity of agricultural practice consequent upon difference of soil and climate, as well as upon the nationality of the cultivator, precludes the exhaustive treatment of this side of the work within the moderate limits of a book of the kind before us: the writer has probably been well advised in making the limitations he has. Each cane-growing district has its own methods and a complete discussion of each is not possible.

Agricultural implements are scarcely described, possibly it might be interesting to illustrate and describe a few of

the forms in common use in the principal cane-growing countries: this might lead to the more extended use of implements which have been proved useful. It might also have been well if some information had been given concerning steam ploughs and cultivators, the use of which appears to be extending.

In connexion with the manuring of the sugar-cane, it would be well to lay stress upon the fact that very different methods of manuring may prove remunerative in different places according to the soil and climate, so that it is unsafe to adopt the practice of one country in another without careful experiment and that each cane-growing country or district should endeavour to determine, by carefully controlled experiments, the system best suited to its own requirements.

The portions relating to machinery and sugar manufacture appear to be sufficiently full and explicit, the various machines being described in order and the theories underlying their working discussed. Detailed consideration is given to questions affecting crushing with and without maceration; the information here brought together must be of great use to those in charge of mills and should have the effect of inducing managers to give this part of their work more careful study on systematic lines and assist in displacing rule-of-thumb methods.

Careful consideration is given to problems affecting heat, its utilization, distribution, and economy, all of which will prove of assistance to those managers who wish to get the best work out of the factories under their charge.

The chapters relating to sugar making proper give good outlines of the various processes. It would have increased the interest of the book if the author could have given more consideration to the working of juices presenting difficulties in their manipulation, the so-called 'gummy juices' often met with in places where the normal development of the cane is interfered with, either by drought, cold, or disease.

The information on chemical points and the chemical control of the factory is full and explicit; no doubt the fact that the present work renders information more easily accessible will tend to further extension of careful chemical control in sugar manufacture in English-speaking countries.

The preparation of alcohol is dealt with at length, an interesting description of methods and of the appliances used being given.

This book will undoubtedly be used as a work of reference. This being so, it is desirable that the index should be more complete; this defect, it is hoped, the author will remedy in the next edition.

'Sugar and the Sugar-cane' may be unhesitatingly recommended to all connected with the sugar industry as being the most convenient hand-book and work of reference on the subject in English with which we are acquainted [F.W.]

HURRICANE INSURANCE.

It is announced in the *West India Committee Circular* that arrangements have now been made at Lloyds to give effect to the scheme for insurance against hurricanes in the island of Dominica formulated by his Honour H. Hesketh Bell, the Administrator of the island. Two rates have been quoted, one for insurance against hurricanes, and the other against damage caused by seismic or volcanic disturbances, and the insurance will cover all kinds of produce except bananas. The rates will work out between 1½ per cent. and 2 per cent., the former figure being approximately that for insurance against hurricanes, and the latter against hurricanes or volcanic disturbances. Against volcanic disturbances alone the rate will be about ½ per cent.

AGRICULTURAL PROGRESS IN CARRIACOU.

The following statement on the agricultural progress of Carriacou is extracted from the *Annual Report on Grenada for 1904*:—

COTTON INDUSTRY.

The cotton industry is almost entirely confined to the dependency of Carriacou, where conditions are highly favourable to its growth. The statistics of the exports, given below, show a steady increase :—

	Raw cotton.	Cotton seed.
Average for five years ended December 31, 1901	Cwt. 2,095	Cwt. 4,537
Exported in 1902	2,212	4,536
„ „ 1903	2,688	6,757
„ „ 1904	2,807	6,844

It may be safely prophesied that, with the present demand in England for British-grown cotton, and with the changed conditions affecting the tenure of land in Carriacou brought about by the Land Settlement Scheme of the Government, this industry has an important future before it. A feature of the current year is the opening up, by one of the largest landowners of the island, of some valuable estates there for the cultivation of Sea Island cotton, an example which the peasant settlers will not be slow in following.

LAND SETTLEMENT SCHEME.

The Land Settlement Scheme continues to make highly satisfactory progress. The details given in last year's report will not be repeated here, but it may be stated that the Government have this year purchased two more properties, the cultivable land of which will soon be sold out on the system adopted, while both estates include valuable reserves for forest conservancy and other public objects. Other important details of the development of the island, such as the improvement of the water supply, the provision of a fine hospital, the erection of a new police station, and the preliminary survey for the erection of a jetty, are being steadily pushed forward under the energetic supervision of the Commissioner, Mr. Whitfield Smith, and the value to the colony of her long-neglected annex is daily becoming more apparent.

* GROUND PROVISIONS, ETC.

This value is likely to be felt by the lower and middle classes in the future, in one way, not yet fully realized, viz., in the capacity of Carriacou, with its crops of annuals, to supply the principal island with 'ground provisions.' Reference has been made to the appearance of these articles among the imports of the colony of late years. Twenty years ago, not only were none imported, but the exports were worth about £600 per annum. The change is due to (1) the increase of population, which proceeds at the rate of 20 per cent. in ten years; and (2) the permanent absorption of the cultivable land of the island by cacao and nutmegs. The result, while favourable to the large landowner, is distinctly unfavourable to the peasant, be he proprietor or labourer, for whereas, years ago, he had his provision 'garden' always available for the support of himself and his family, and probably had also a small piece of pasture for his cattle, the areas thus beneficially occupied either have been or are being absorbed by

permanent cultivation, on the proceeds of which he is becoming more and more dependent. Inasmuch as this permanent cultivation does not provide continuous employment for a large number of labourers, such as the cultivation of annuals does, it will be seen that a situation full of possible difficulty is being created for the future. Were it not for liberal expenditure on public roads and works, the pressure would have been felt already more than it has been.

An additional agricultural industry, which requires annual cultivation and reaping, such as that of sugar-cane or cotton, would be a boon to Grenada, where some of the low-lying coast lands still remain uninvaded by the ruling industries. Such cultivation would admit of vegetables being grown along with it, and alternatively to it, and would also provide steady employment for a number of labourers, thus solving what is likely to become within the next decade a pressing question for the community. Meanwhile, the agricultural development of the land of Carriacou, within a few hours' sail of the principal island, is a factor in the situation, which may be of considerable assistance by providing supplies of vegetables at cheaper rates than those at which they could be imported from other colonies.

KOLA NUTS.

At a meeting of the Royal Colonial Institute on November 28 last, Mr. T. J. Alldridge, I.S.O., read a paper on 'Sierra Leone and its undeveloped Products.' In the course of the paper he spoke of the kola nut tree, making the following reference to this product :—

The kola nut tree ranks next in importance to the oil palm. The nut is eaten with enjoyment by every person throughout the entire colony. Not only is it considered to be a great staver-off of hunger and a preventive against sleep, but the offering of kolas is an important custom at all country ceremonies and is the usual complimentary greeting in daily life. Although such large quantities are locally consumed, still sufficient remain to make extensive shipments to the natives at the Gambia and at Senegal.

The kola nut tree attains considerable size; the value of the nuts on one tree may vary from £1 to £6. The gathering of the nuts sets in motion the activities of the Sierra Leone woman trader, who travels all over the country, collecting them in small quantities from the villages in which a few trees may be found. I have known the congregation of the churches at Sherbro during the kola season to be diminished by half, through the absence of these women traders buying kola. It is one of the native trades in which there is the keenest competition, and it is peculiarly suited to these women folk, as the nuts require very delicate handling and constant over-hauling and re-packing on account of an insect peculiar to the nut.

The exports to Europe are merely nominal—of the £76,000 value in 1903, under £200 went to Europe.

It may be mentioned that the natives usually chew a small piece of the kola kernel before each meal as a promoter of digestion. Kola has a reputation for sustaining the system against fatigue.

Full information in regard to the different kinds of kola nuts appeared in the *West Indian Bulletin* (Vol. IV, pp. 182-8), special reference being made to the prospects of kola nuts in commerce.

MARKET REPORTS.

London,—December 8, 1905. Messrs. KEARTON, PIPER & Co.; Messrs. E. A. DE PASS & Co.; 'THE WEST INDIA COMMITTEE CIRCULAR,' 'THE LIVERPOOL COTTON ASSOCIATION WEEKLY CIRCULAR,' December 1, 1905; and 'THE PUBLIC LEDGER,' December 2, 1905.

ALOE—Barbados, 15/- to 60/-; Curaçoa, 17/- to 55/- per cwt.
 ARROWROOT—St. Vincent, 1½d. per lb.
 BALATA—Sheet, 1/4 to 1/11; block, 1/4 to 1/4½ per lb.
 BEES'-WAX—£7 10s. to £7 17s. 6d. per cwt.
 CACAO—Trinidad, 52/- to 56/- per cwt.; Grenada, 46/- to 52/- per cwt.
 CARDAMOMS—Mysore, 7½d. to 3/- per lb.
 COFFEE—Jamaica, good ordinary, 39/- to 40/- per cwt.
 COTTON—West Indian, medium fine, 6.75d.; West Indian Sea Island, medium fine, 13d.; fine, 14d.; extra fine, 15½d. per lb.
 FRUIT—
 BANANAS—Jamaica, 4/6 to 6/- per bunch.
 GRAPE FRUIT—7/- to 10/- per box.
 LIMES—4/- to 4/6 per box.
 ORANGES—Jamaica, 4/6 to 9/- per box of 176-200.
 FUSTIC—£3 5s. to £4 per ton.
 GINGER—Jamaica, 38/6 to 46/- per cwt.
 HONEY—20/- to 23/- per cwt.
 ISINGLASS—West Indian lump, 2/1 to 2/5; cake, 1/4 per lb.
 KOLA NUTS—4d. to 6d. per lb.
 LIME JUICE—Raw, 9d. to 1/- per gallon; concentrated, £16 per cask of 108 gallons; hand-pressed, 2/3 to 2/6 per lb. Distilled Oil, 1/4 per lb.
 LOGWOOD—£4 to £4 15s.; roots, £3 10s. to £4 per ton.
 MACE—Good pale, 1/5; red, 1/1 to 1/2 per lb.
 NITRATE OF SODA—Agricultural, £11 2s. 6d. per ton.
 NUTMEGS—102's, 6d.; 105's, 5½d. to 6d.; 116's, 5¾d. per lb.
 PIMENTO—Fair, 2¾d. to 2½d. per lb.
 RUM—Demerara, 1/1 to 1/2½ per proof gallon; Jamaica, 2/1 per proof gallon.
 SUGAR—Yellow crystals, 14/- to 17/6 per cwt., Muscovado, 15/- to 15/6 per cwt.; Molasses, 11/- to 14/- per cwt.
 SULPHATE OF AMMONIA—£12 10s. per ton.

Montreal,—October 18, 1905.—Mr. J. RUSSELL MURRAY. (In bond quotations, c. & f.)

COCOA-NUTS—Jamaica, \$27.00 to \$29.00; Trinidad, \$24.00 to \$25.00 per M.
 COFFEE—Jamaica, medium, 10c. to 11c. per lb.
 GINGER—Jamaica, unbleached, 7½c. to 10c. per lb.
 MOLASCUIT—Demerara, \$1.00 per 100 lb.
 MOLASSES—Barbados, 31c.; Antigua, 26c. per Imperial gallon.
 NUTMEGS—Grenada, 110's, 18c. per lb.
 ORANGES—Jamaica, \$5.50 per barrel, duty paid.
 PIMENTO—Jamaica, 5¼c. per lb.
 SUGAR—Grey crystals, 96°, \$2.08 to \$2.25 per 100 lb.
 —Muscovados, 89°, \$1.60 to \$1.75 per 100 lb.
 —Molasses, 89°, \$1.35 to \$1.50 per 100 lb.
 —Barbados, 89°, \$1.45 to \$1.70 per 100 lb.

New York,—December 8, 1905.—Messrs. GILLESPIE Bros. & Co.

BEES'-WAX—No quotations.
 CACAO—Caracas, 12c. to 12½c.; Grenada, 10½c. to 11c.; Trinidad, 11¼c. to 11½c.; Jamaica 9¾c. to 10½c. per lb.
 COCOA-NUTS—Jamaica, \$26.00 to \$27.00; and Trinidad, \$23.00 to \$24.00 per M.
 COFFEE—Jamaica ordinary, 8¼c. to 10½c. per lb.
 GINGER—Jamaica, 7c. to 9c. per lb.
 GOAT SKINS—Barbados, Dominica, and Jamaica, 58c.; St. Kitt's, 50c. per lb.

GRAPE FRUIT—Jamaica, \$3.00 to \$4.00 per barrel; \$1.50 to \$2.50 per box.
 HONEY—Jamaica, 65c. to 67c. per gallon (duty paid).
 LIMES—No quotations.
 MACE—27c. to 31c. per lb.
 NUTMEGS—West Indian, 63's to 69's, 24c.; 70's to 80's, 20c.; 105's to 110's, 13c.; 115's to 130's, 10c. per lb.
 ORANGES—Jamaica, \$2.75 to \$3.50 per barrel; \$1.40 to \$1.75 per box.
 PIMENTO—4¾c. per lb.
 PINE-APPLES—No quotations.
 SUGAR—Centrifugals, 96°, 3½c.; Muscovados, 89°, 3c.; Molasses, 89°, 2½c. per lb.

INTER-COLONIAL MARKETS.

Barbados,—December 16, 1905.—Messrs. T. S. GARRAWAY & Co., and Messrs. JAMES A. LYNCH & Co., December 23.

ARROWROOT—St. Vincent, \$3.50 per 100 lb.
 CACAO—\$9.00 to \$9.50 per 100 lb.
 COCOA-NUTS—\$11.25 per M. for husked nuts.
 COFFEE—\$10.50 to \$11.75 per 100 lb.
 HAY—\$1.00 per 100 lb.
 MANURES—Nitrate of soda, \$65.00; Ohlendorff's dissolved guano, \$55.00; Cotton manure, \$48.00; Sulphate of ammonia, \$75.00; Sulphate of potash, \$67.00 per ton.
 ONIONS—Madeira, \$2.50 per 100 lb.
 POTATOS, ENGLISH—Nova Scotia, \$2.00 to \$2.40 per 160 lb.
 RICE—Ballam, \$4.20 to \$4.40 per bag (190 lb.); Patna, \$3.15 to \$3.25; Rangoon, \$2.65 to \$2.75 per 100 lb.

British Guiana,—December 20, 1905.—Messrs. WIETING & RICHTER.

ARROWROOT—St. Vincent, \$8.00 per barrel.
 BALATA—Venezuela block, 25c.; Demerara sheet, 38c. per lb.
 CACAO—Native, 12½c. per lb.
 CASSAVA STARCH—\$4.50 per barrel.
 COCOA-NUTS—\$10.00 to \$12.00 per M.
 COFFEE—13¼c. to 13½c. per lb.
 DHAL—\$4.60 to \$4.65 per bag of 168 lb.
 EDDOES—\$1.20 to \$1.44 per barrel.
 ONIONS—Lisbon, 3c. per lb. (ex store).
 PLANTAINS—8c. to 32c. per bunch.
 POTATOS, ENGLISH—\$2.50 to \$2.60 per barrel.
 POTATOS, SWEET—Barbados, \$1.20 per bag.
 RICE—Ballam, \$4.30 per 177 lb.; Creole, \$4.00 per bag (ex store).
 SPLIT PEAS—\$5.80 per bag (210 lb.).
 TANNIAS—\$1.20 per barrel.
 YAMS—White, \$2.16; Buck, \$2.52 per bag.
 SUGAR—Dark crystals, \$1.95 to \$2.00; Yellow, \$2.50 to \$2.65; White, \$3.75 to \$4.00; Molasses, \$1.75 to \$2.00 per 100 lb. (retail).
 TIMBER—Greenheart, 32c. to 55c. per cubic foot.
 WALLABA SHINGLES—\$3.00, \$3.75, and \$5.25 per M.

Trinidad,—December 22, 1905.—Messrs. GORDON, GRANT & Co.; and Messrs. EDGAR TRIPP & Co.

CACAO—Ordinary to good red, \$11.10 to \$11.15; estates, \$11.30 to \$11.50 per fanega (110 lb.); Venezuelan, \$11.50 to \$12.25 per fanega.
 COCOA-NUTS—\$21.00 per M., f.o.b.
 COCOA-NUT OIL—72c. per Imperial gallon (casks included).
 COPRA—\$2.90 to \$2.95 per 100 lb.
 DHAL—\$3.20 to \$3.25 per 2-bushel bag.
 ONIONS—\$1.60 to \$1.70 per 100 lb. (retail).
 POTATOS, ENGLISH—60c. to 70c. per 100 lb.
 RICE—Yellow, \$4.25 to \$4.40; White, \$4.90 to \$5.50 per bag.
 SPLIT PEAS—\$5.20 to \$5.25 per 2-bushel bag.
 SUGAR—White crystals, \$4.50; Yellow crystals, \$2.75 to \$3.00; Molasses, \$2.75 to \$3.00 per 100 lb.



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capable of resisting the attacks of disease which destroyed the older forms, as well as increasing the yield of sugar. Several experiment plots were maintained in the West Indies from 1888 to 1898, and the success of the results thus obtained must be very gratifying to those who were engaged in the work, for the seedling canes raised by Mr. Bovell and Professor Harrison in Barbados, by Mr. Jenman and Professor Harrison in British Guiana, and by Mr. Hart in Trinidad are now well known in most of the sugar-producing countries of the world.

The earlier method adopted for producing improved seedling canes was by means of a careful selection of casually produced seedlings. The identity of seedlings was derived from the seed-bearing parent only. A further step was raising seedlings from canes planted in alternate rows so that the pollen-bearing parent might be identified as well as the seed-bearing parent. Experiments in this direction were carefully carried on in Java, Barbados, and British Guiana.

Raising Pedigree Sugar-canes.

THE first announcement respecting the possibility of raising seedling sugar-canes in the West Indies was made at various times in Barbados between 1859 and 1888. A similar announcement was made in Java in 1887. Since that time seedling varieties have been raised which are

By means of a system of rigorous selection both in the field and in the laboratory several good varieties have been raised, but a large percentage of the seedlings produced, as was to be expected, have proved to be worthless. In any case, it took several years before a seedling cane was sufficiently tested under varying conditions to deserve to be recommended to planters, and even then it was left to the planter himself to make a final selection of those which were likely to be suitable for his purposes, as a seedling

cane might give very good results in certain soils, or in a wet or dry season, while proving an utter failure in others.

The latter method of attempting to secure cross-fertilization between known varieties referred to above was carried out in Java and elsewhere by carefully selecting two varieties known to arrow at the same time and planting them in adjacent plots. By these means it was hoped that one variety would be crossed by the other. In some cases this no doubt took place. Another step was the bagging of the arrows some time before they reached maturity. On the ripening of the pollen, the contents of one bag were shaken into the bags of another variety, which was to be the female parent. As some of the seedlings were suspected of having been produced by pollination *inter se*, some uncertainty still remained as to the parentage of the resultant seedlings.

An important step in advance was made in the hybridization of the sugar-cane, when it was found that certain varieties did not produce fertile pollen, while their pistil was normal; whereas other canes produced a very large amount of normal pollen. Taking advantage of this, the Imperial Department of Agriculture in 1902 started artificial cross-pollination, by means of which the flowers of one variety were emasculated while still young, and then pollen was transferred from another variety by means of a camel's hair brush. Owing to the minute character of the flowers of the sugar-cane, this was a difficult process, especially as it had to be carried out while the operator stood on a temporary platform 10 to 12 feet high. This experiment was, however, successfully carried out by Mr. L. Lewton-Brain, B.A., F.L.S., (now Assistant Director of Vegetable Pathology, Hawaiian Sugar Planters' Association) in November 1904, when he was Mycologist on the staff of the Imperial Department of Agriculture for the West Indies. He worked with some of the best of the Barbados varieties and obtained five seedlings, which proved that the raising of hybrid sugar-canes by artificial cross-fertilization was practicable. The resulting seedlings are the first raised in the West Indies whose parentage on both sides is a matter of certainty. They are being carefully propagated, and instructive results are expected to follow. The method adopted by Mr. Lewton-Brain is fully described in the *West Indian Bulletin* (Vol. V, pp. 362-3).

In view of the success of this work, it was decided last year to make systematic attempts, on a larger scale.

The work was entrusted to Mr. F. A. Stockdale, B.A., Mycologist on the staff of the Imperial Department of Agriculture. Owing to fluctuating variations in some of the new seedlings, only those which had stood stringent tests on a large scale, for a considerable time, were used in the experiments. That is, an attempt was made to raise pedigree seedlings from selected varieties only. Of these, B. 147 and B. 208 were considered the best, and over 400 spikelets of these two varieties were emasculated and pollinated. Three sound canes were chosen in the varieties to be used, and at least a dozen spikelets in each arrow were operated upon. Crossing was then made in two directions, the pollen parent in one cross being used as the seed parent in the other cross; in other words, one variety was utilized as the female parent in one cross and as the male parent in the other cross.

In all, over 600 spikelets were emasculated and artificially pollinated last year, and it is hoped that the results obtained may be such as will, before long, fully carry out the objects in view. A concise account is being kept of the crosses performed, and next year it is hoped that a series of investigations into the cytology of the sugar-cane will be carried on, with the view of determining exactly the right age for pollination, as well as overcoming many of the mechanical difficulties that have hitherto been met with.

If the results of the new method of breeding sugar-canes described above are still further extended during the next few years, and the lines so successfully adopted by Messrs. Garton and others in raising new varieties of wheat and oats in England are closely followed, the prospects of the sugar industry in these colonies should be still further improved. There are now no good reasons why we should not be in a position to produce pedigree sugar-canes as well as pedigree wheat and oats.

CO-OPERATION IN AGRICULTURE.

On agricultural lines, both in England and Ireland, the co-operative idea has found successful adoption. In Ireland the co-operative societies number about 800, with 79,000 members, and controlling a trade of \$7,200,000. The societies are formed almost wholly of the small working farmers, and they are generally well satisfied with the practical benefits that have been assured in the past. With an increase of about sevenfold in a comparatively short time, the advocates of the co-partnership plan feel decidedly hopeful as to the future. It is a pleasure to note that the report shows a devotion on the part of the controlling factors to plain duty honestly performed of the most gratifying character, meeting high ideals faithfully. (*U. S. Monthly Consular Reports*, October 1905.)

A note was published in the last issue of the *Agricultural News* (p. 2) in reference to the meetings of the Canadian Tariff Commissioners. Reference was made to the suggestion of Mr. Russell Murray that 'molascuit, a product of the débris of ground sugar . . . should be placed on the free list.' It is desirable to mention that molascuit is a mixture of molasses and the finer parts of the fibre of the sugar-cane, containing about 80 per cent. of the former and 20 per cent. of the bagasse. Readers of the *Agricultural News* are referred to notes on this by-product, and its preparation and uses, in former issues (Vol. I, pp. 22 and 147, and Vol. III, p. 370).



WEST INDIAN FRUIT.

BUDDED ORANGES.

The following is a list of budded oranges cultivated at the St. Clair Experiment Station at Trinidad, with notes furnished by Mr. J. H. Hart, F.L.S., the Superintendent. A complete set of these oranges was recently forwarded to the Imperial Department of Agriculture for a report on their relative merits. The notes made by Mr. Hart, based on observations extending over a period of three years, are well borne out by the specimens examined by the Department.

As far as can be judged from the fruit produced this year, the sorts are fairly true to name, especially the King, Jaffa, Pine-apple, Hart's Tardiff, Washington Navel, Parson Brown, and the Tangerine. These are practically the best sorts for growing in the West Indies. At Jamaica, a planter, with about 10,000 orange trees in full bearing, expressed the opinion that the Centennial and the King were the finest oranges of any; Hart's Tardiff came next, and then the Jaffa and Pine-apple. We should be inclined to add the Washington Navel, when true to type, to this list, which would then be complete for all practical purposes:—

DESCRIPTION OF ORANGES GROWN AT ST. CLAIR EXPERIMENT STATION, TRINIDAD—BUDDED ON SOUR ORANGE STOCK.

Homosassa.—A medium-sized orange, very sweet. Does not colour until late (December to January). Good bearer. Thin rind.

Majorca.—Good size and colour. A spare cropper. Fruit highly flavoured. The tree is erect branched and irregular in growth.

✕ *Parson Brown*.—Very productive variety and a vigorous grower. The fruit colours late. A fine orange of medium size. To be recommended for heavy cropping.

✕ *Tardiff*.—An orange that ripens late, December and January, or later. The last of the season, excluding the King. Slightly acid flavour, with plenty of juice.

✕ *St. Michael's Blood*.—A good bearer, producing medium-sized orange. Sweet and excellent in flavour. The tree is of straggling growth. Many people assume that the flesh of the orange under this name is the colour of blood. Our specimens are deep yellow only.

Ruby.—Produces good-sized fruit with plenty of juice. Very sweet with deeply tinted flesh. Good cropper. Irregular growing tree.

✕ *St. Michael*.—Our form is a good bearer. Fruits of medium size; flavour excellent, with a rather thick rind.

✕ *Sandford's Mediterranean*.—An excellent cropper; rather late in ripening. Fruit medium sized. Rind thin. Good flavour.

✕ *King*.—An orange of the tangerine type, with a coarse, thick rind. The tree is an erect grower and abundant bearer. The flesh has a fine, almost vermilion colour, and when fully ripe has an excellent flavour. The fruit ripens very late in the season. The rind, it may be added, yields an excellent essential oil.

Lamb's Summer.—A regular cropper, giving oranges nearly all the year round; but mostly in season from October to December. The fruit is of medium size; sometimes in dry weather it comes small. A good-flavoured orange with a thin rind.

✕ *Jaffa*.—A fine, large, yellow orange. Fine flavour; sweet; medium rind. The tree is vigorous, rather tall, and a regular cropper. A kind to be strongly recommended.

✕ *Pine-apple*.—A fine cropper yielding oranges of a fine yellow colour; medium in size and deliciously sweet, with a flavour peculiarly its own though scarcely true to the name. Its one fault is that it produces numerous seeds. The tree is a good bearer and regularly productive.

✕ *Washington Navel*.—Produces large oranges of a fine yellow colour and characteristic form; possessing fine sweet pulp and juice. The fruit is large in size; not a heavy cropper.

✕ *Tangerine*.—A Florida variety; medium sized. A fine-flavoured variety of *Citrus nobilis*. It has a thin rind, and when ripe is of a dull-yellow colour. The tree bears well and appears to thrive in Trinidad.

MOSQUITO-CATCHING PLANT.

Mr. J. H. Hart, F.L.S., Superintendent of the Royal Botanic Gardens in Trinidad, writes that he recently had under observation some interesting specimens of an aquatic plant collected from the Pitch Lake at La Brea. Some of the material produced peculiar pear-shaped organs at regular intervals on the stems. 'I observed one of these organs holding the larva of a mosquito by the tail, the larva being quite dead. . . Later, I observed another larva just caught and securely held, which, though struggling hard, could not procure its freedom.'

Mr. Hart suggests that, by encouraging the growth of this plant in pools, it may be possible to keep down mosquitos.

The plant has been identified by Mr. Hart as belonging to the genus *Utricularia* of the natural order *Lentibulariaceae*. The organs of these plants have long been known to be capable of catching small aquatic animals.

FUNGOID DISEASE OF THE BANANA.

The following information in regard to a fungoid disease of the banana is extracted from an article in the *Trinidad Bulletin of Miscellaneous Information*, for January 1904, on the cultivation of bananas:—

Where the disease caused by a fungus known as *Marasmius semiustus* is prevalent, the cultivation of bananas becomes a very difficult matter, and good bunches are seldom produced. In such cases, it is better to refrain from attempting the cultivation than to run the risk of decimation by disease. In some districts this disease is found to do a large amount of damage, while in others its action is not sufficient to be taken into account. This is possibly due to the character of the soil, for it is a noticeable fact that bananas suffer but little from this cause on rich soil, while on poor and gravelly lands they suffer very severely and bunches suitable for export can seldom be obtained. It is important that planters should always procure plants from lands not infected by disease, as there is little doubt that it can be carried from place to place by means of suckers from an infected area. There are large tracts of land in Trinidad, where the disease is practically unknown, which already produce fruit in quantity. In unsuitable soils in dry districts the fruit is inferior principally from this cause.

FRUITING OF BANANAS.

The matter of timing the fruiting of bananas so as to get the fruit in during the period of highest prices is of the utmost importance to growers. The following is extracted from an article on this subject in the *Journal of the Jamaica Agricultural Society*, for December 1905:—

The price of bananas is a very important one to us. It varies according to the demand for bananas in northern markets, and, unlike many other crops, the prices remain year after year remarkably uniform during the same months of the year. From the beginning of March until the end of June (four months) the prices are substantial and pay handsomely. It has been the object of the most advanced banana growers so to conduct their cultivation as to get as many bunches as possible marketed in these months. On many plantations the bulk of the fruit is brought in and sold within that period; but by far the most of the banana trees growing in Jamaica fruit in the four months following these, July to October, because this is the natural season for them to fruit if left to themselves. No man, however, should be called an agriculturist who does not try to cultivate his crops and so manage them that he gets his crops in when the market most wants the product. It should therefore be the business of every banana grower to study the science and practice of banana growing. He can learn this partly from his own observations of his plants, by studying the results from his soil and locality, from whatever any successful neighbour does, or from study of the agricultural publications where the subject is dealt with.

We know no more important subject, among many subjects of importance to us at the present time, than this timing of bananas, and yet, strange to say, it has been one of the most neglected, probably, we think, because few have realized until lately, when competition became so severe, the full importance of timing bananas. Even after this was realized, the proper system of working bananas to fruit in the spring has not been understood. The length of time that ratooning bananas take to mature has never been closely observed until lately.

AGRICULTURAL INDUSTRIES OF GRENADA.

The following is extracted from the *Annual Report* on the colony of Grenada for the year 1904:—

The staple products of the colony are cacao, spices (chiefly nutmegs), and cotton. There is a certain amount of sugar-cane and coffee cultivated for local consumption and a small quantity of kola nuts (value about £300 per annum) for export.

CACAO.

A record has been kept of the cacao crops for the years ending September 30, since 1878, and the average crops for quinquennial periods from 1880 to 1904, inclusive, are given below:—

Quinquennial period.	Bags.
For five years ending September 30, 1884 ...	29,267
" " " " " " 1889 ...	36,620
" " " " " " 1894 ...	46,418
" " " " " " 1899 ...	49,891
" " " " " " 1904 ...	59,661

The bag averages 180 lb.

The crop for the year under review was the largest on record, viz., 67,225 bags, exceeding that of the previous year by 4,206, and the five years' average by 7,564 bags.

SPICES.

Owing to the absence of uniformity in the packages in which spices are shipped, a comparison by crops is not so easy as in the case of cacao, so the figures, by weight, of the quantities exported are resorted to for comparison:—

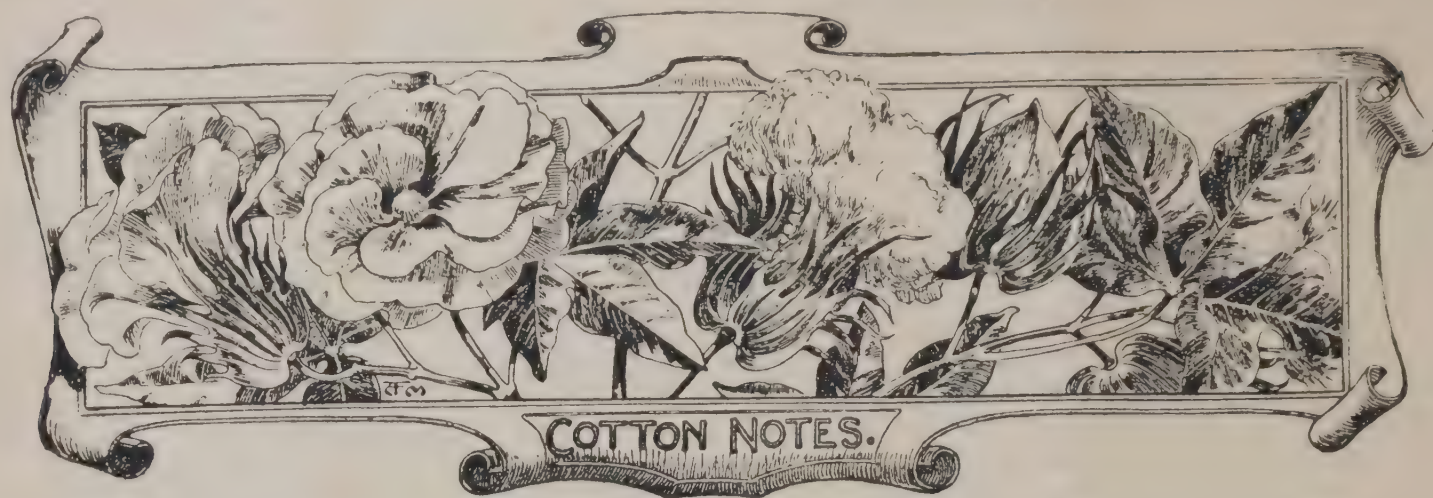
	Cwt.
Average for five years ended December 31, 1901	4,624
Exported in 1902 (Nutmegs 5,999 cwt.) ...	6,839
" " 1903 (" 6,944 ") ...	7,959
" " 1904 (" 5,900 ") ...	6,915

The output of 1904 was, therefore, about 1,000 cwt. less than in the preceding year, a result which is doubtless attributable to the irregular incidence of the rainfall in the year under notice.

OINTMENTS FOR THE TROPICS.

The following suggestion has been offered by the Barbados Branch of the British Medical Association in regard to the preparation of ointments for use in the tropics:—

As lard, almond oil, and spermaceti soon become rancid in tropical climates, the Branch would advise their exclusion in the preparation of ointments, and the substitution, where possible, of soft paraffin with 10 per cent. hard paraffin or purified lanolin. In the case of citrine ointment, white paraffin is required.



SEA ISLAND COTTON MARKET.

The 'Sea Island Cotton Report' of Messrs. Henry W. Frost & Co., of Charleston and Savannah, dated December 16, 1905, has the following:—

Islands.—The market remained unchanged, with only a moderate demand for fully fine at 24c. and extra fine at 26c. Notwithstanding that there was no inquiry in the market for fine at 23c., factors are refusing to lower prices and continue to hold firmly the three grades for the above figures.

There has been some inquiry for crop lots, but it has resulted in the sale of only one lot at 29c., as factors are refusing to accept the lower offers made.

A week later the same firm reports:—

The market has been quiet and unchanged during the week, with sales only of 117 bales of extra fine at 26c. With no improvement in demand, however, to effect sales, factors will in time have to lower their prices.

COTTON PLANTING IN ST. KITT'S.

As showing what was done in St. Kitt's in 1901 in the matter of starting the cotton industry in that island, the following, communicated by Mr. F. R. Shepherd, Agricultural Superintendent, may be of interest:—

At the request of Dr. Francis Watts, I am forwarding to you, herewith, a statement showing the amount of Sea Island cotton planted in St. Kitt's in the latter part of the year 1901.

This cotton was planted by Messrs. Sendall and Wade on their estates as trial plots, and a small lot was also planted by Hon. B. S. Davis at Lamberts estate at Mr. Wade's request.

From this statement it would appear that about 20 acres of Sea Island cotton were planted, giving a return of 2,689 lb. of lint, in the year 1901.

Statement of Cotton Cultivation in St. Kitt's in 1901.

Estate.	Acreage.	When planted.	Pounds of seed-cotton.	Pounds of lint.
Canada ...	16	October.	8,077	2,256
Hermitage ...	1	"	615	175
Douglas ...	$\frac{1}{2}$	"	500	142
Lavingtons ...	$\frac{1}{2}$	"	136	38
Whites ...	$\frac{1}{2}$	"	36	10
Lamberts ...	2	"	240	68
Total ...	20 $\frac{1}{2}$		9,604	2,689

SEA ISLAND COTTON.

The following is extracted from an article in *Tropical Life*, for December 1905:—

It behoves the West Indies and other centres to make the most of this excellent opportunity and push ahead in their endeavours to increase the output of supplies from their islands. In these days of over-production and over-trading, it is a pleasure to hear of one product that is wanted, and those who have gone in for Sea Island cotton will do well to remember this.

The main drawback to Sea Island cotton is its small yield, as compared with other varieties, and also its tendency to attract pests. In this it greatly resembles the mild cinnamon-red Criollo cacao, as compared with the darker, stronger, and hardier Forastero kind, the first one bearing less, but selling for more; yet, in spite of that, its delicate nature has driven it out of cultivation in most places in favour of hardier kinds. With cotton, however, with a careful process of selection and cultivation, the plague of pests can, to some degree, be eliminated, and as the areas suitable for Sea Island must of necessity be so restricted, as it cannot successfully be raised inland without deteriorating, those who have the genius and patience to raise it would be well advised to take up the industry, if they are determined to go through with it.

BUYING COTTON.

The following note on buying cotton is extracted from Monie's *The Structure of the Cotton Fibre*:—

The buyer of cotton ought to be a man of long and varied experience, not only theoretically, but in its practical manipulation. Under ordinary circumstances, therefore, the intelligent, careful, and conscientious mill manager is the right and proper person for the post. If conscientious, his own personal interest lies in getting the cotton most suitable for his purpose at the lowest price, as the results will show in the working of his mill, and in the reputation which he must realize accordingly. The operation seems simple enough. General cleanness seems obvious, but this is not all. I have seen two samples of cotton look equally dirty, but in the one case the impurities were such that they were capable of being removed without much damage to the fibres, whereas with the other there would have been considerable loss. The worst impurity is 'nep,' the next irregular fibres, then leaf and seed, and lastly sand. In an examination of samples of cotton the presence of these impurities should be carefully considered, and when that is done, it is time to decide about length and strength. Every one is familiar with the rough and ready test of pulling out and breaking between the fingers, and in the hands of an expert a very accurate decision can be arrived at.

INOCULATION FOR ANTHRAX.

In continuation of the information already published in the *Agricultural News* (Vol. IV, p. 318, and Vol. V, p. 7) in reference to inoculation for anthrax, the following report by Mr. J. Duncan Millar, the Government Veterinary Surgeon, Trinidad, addressed to the Imperial Commissioner of Agriculture, is likely to be of general interest:—

Anthrax was first observed by me in the slaughteries here in cattle coming from Venezuela in 1903.

This year—1905—twenty-four cases occurred in the colony in one district: how it originated has not been traced. Since August 17 no cases have occurred in the district. The method of treatment was: a cordon of police stationed around the district and all traffic stopped, where cases occurred carcasses were burnt up, places disinfected with lime and carbolic acid, and all animals on infected estates inoculated with anthrax vaccine.

This method of treatment proved to be thoroughly satisfactory, as no spread of disease occurred and the outbreak was stamped out within a month.

The Government has made regulations making it compulsory to vaccinate all stock on an infected estate, and free vaccination has been recommended. All reported cases to be tested by microscopic examination.

Operation of Vaccination.—

The method of procedure may be attended with bad results if employed by unskilled hands, as there are many accidents that may happen in the operation if great care is not exercised. Such as:—from using dirty syringes, not using disinfectants, injury to the animals from improper handling, etc.

For my own part, I have vaccinated several thousands without one bad result. Frequently animals have been taken out of work, vaccinated, and sent back to work again.

I proceed as follows:—

(a.) Horses and mules are secured with a twitch, cattle are tied by the head to a post and two men hold the tail to the opposite side from the operator. Smaller animals are easily secured.

(b.) The place to vaccinate is either in the subcutaneous tissue of the neck or behind the shoulder. The first vaccine is generally used on the left side and the second vaccine on the right, although I have vaccinated a few on the same side with both vaccines without any bad result. Smaller animals are vaccinated on the inside of the thighs.

(c.) I wash an area of 12 inches of the skin where the animal is to be vaccinated with one part of creoline to 1,000 parts of water. Have syringe thoroughly disinfected with above solution, and finally cleanse with boiled water before using.

Five to 10 minims of first vaccine are injected hypodermically, and from ten to fourteen days thereafter 5 minims of second vaccine are injected.

Considerable dexterity is necessary in using the syringe otherwise the needle may get broken, blunted, or considerably more vaccine sucked from the syringe, in case the operator is not quick in withdrawing the syringe after the necessary dose has been injected.

The vaccine I prefer is that made at the Liverpool School of Medicine and obtained from Messrs. Evans, Sons, Lescher & Webb, Ltd., Liverpool and London.

The first cost is 6s. 6d. per double tubes of twenty-four doses; syringes are also supplied at 6s. 3d.

I shall be glad to let you have any further assistance you may desire on the subject.

ST. KITT'S.

Formation of an Agricultural and Commercial Society.

At a meeting convened by Sir Robert Bromley, the Administrator of St. Kitt's-Nevis, and held in the Court House in Basseterre, St. Kitt's, on Wednesday, December 13, there was present a large number of the leading members of the community. His Honour stated the object of the meeting was to discuss the advisability of starting an Agricultural Society. He thought the island was losing a great deal by not having a society of the kind. In fact, it was a reproach to the community, which was an agricultural one, that there existed no such institution. Referring to the Agricultural Society of Nevis, the Administrator declared that it was doing excellent work. He dwelt on the necessity of co-operation in order to secure the best possible results. The welfare of the colony depended most intimately on agriculture. Therefore the importance of having a society to meet and discuss agricultural matters was very obvious. On the success of the sugar industry, especially, rested the fortunes of St. Kitt's. At present, if anything occurred to prevent them from finding a market for their muscovado sugar, ruin would probably ensue. One of the first matters to which an agricultural society should direct its attention, therefore, would be the discovery of the ways and means for establishing central sugar factories. The meeting afforded the leading men of the presidency the opportunity to express their views on the matter.

A number of gentlemen supported the Administrator, and ultimately a resolution was passed unanimously, to the effect that it was expedient to establish a society to be called the St. Kitt's Agricultural and Commercial Society. In the course of the speeches made at the meeting it transpired that, so far back as 1839, there had been an Agricultural Society in operation in the island. This society, with which all the prominent men in the place were connected, continued to exist up to 1849. Later on, in 1884, during the administration of Governor Haynes-Smith, it was resuscitated, continued in existence for a few years, and then collapsed. Before the meeting separated it was decided that Sir Robert Bromley, the Administrator, should be Patron-President of the society, Mr. E. D. B. Dobridge, President, and Mr. E. S. deLisle, Vice-President. Thus St. Kitt's is about to enjoy once more the benefits of an Agricultural Society. It is interesting to note that that island, as one gentleman at the meeting put it, has shaken itself free from the shackles of impecuniosity which bound it hand and foot some years ago, and is now paying its way, and no longer subsisting on the charity of the British taxpayer.

DEPARTMENT NEWS.

Mr. W. R. Buttenshaw, M.A., B.Sc., Scientific Assistant on the staff of the Imperial Department of Agriculture, is expected to leave Barbados by the R.M.S. 'Tagus' on the 21st. instant, on three months' leave of absence.

The Secretary of State for the Colonies has been pleased to extend with half-salary the leave of absence granted to Mr. H. A. Tempany, Assistant Chemist for the Leeward Islands, from January 6 to February 19, inclusive.

EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming, should be addressed to the Commissioner, Imperial Department of Agriculture, Barbados.

All applications for copies of the 'Agricultural News' should be addressed to the Agents, and not to the Department.

Local Agents: Messrs. Bowen & Sons, Bridgetown, Barbados. *London Agents:* Messrs. Dulau & Co., 37, Soho Square, W., and The West India Committee, 15, Seething Lane, E.C. A complete list of Agents will be found at foot of page 3 of the cover.

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Agricultural News

VOL. V. SATURDAY, JANUARY 20, 1906. No. 98.

NOTES AND COMMENTS.

Contents of Present Issue.

A brief account of the efforts made to produce pedigree sugar-canes is given in the editorial in the present issue.

Other notes of interest in regard to the sugar industry will be found on p. 19. A summary is published of the results of the manurial experiments with sugar-canes in the Leeward Islands.

On p. 20 there will be found a useful list of budded oranges grown at the St. Clair Experiment Station, Trinidad, with notes as to their characteristics.

A further article on inoculation for anthrax appears on p. 23. This contains information particularly as to the procedure adopted in using the anthrax vaccines.

The insect notes in this issue of the *Agricultural News* are of special interest to cotton growers. Attention is drawn to the note on the use of Paris green and lime. (See p. 26.)

Useful hints on the growing of tomatoes will be found on p. 27.

Poultry breeders are likely to find much of interest in the article reproduced on pp. 30-1, on the Guinea fowl.

On p. 31 a review of the agricultural progress of Barbados is reproduced from the *Annual Report* on the colony for 1904-5. This is followed by a note on the use of rat virus.

Carriacou Cottagers' Show.

It was briefly mentioned in the *Agricultural News* (Vol. IV, p. 147) that arrangements were being made to hold a Cottagers' Show at Carriacou. It has now been definitely decided to hold this show at the Recreation Grounds, Hillsborough, on Friday, January 26. His Excellency the Governor will distribute the prizes.

It may be mentioned that a small grant for prizes and four Diplomas of merit have been offered by the Imperial Commissioner of Agriculture.

Manuring Sugar-cane in the Leeward Islands.

The summary (published on p. 19) of the results of the manurial experiments with the sugar-cane in the Leeward Islands indicates in a very clear manner the manurial requirements of the sugar-cane in St. Kitt's-Nevis. These experiments have now been carried on for five years in the case of plant canes and for four years with ratoons. It is therefore possible to draw conclusions with some measure of confidence.

No artificial manures are required for plant canes, when 15 to 20 tons of good pen manure have been applied.

With ratoons, however, artificial manures are necessary to give the best results. The constituent required is nitrogen; the use of potash and phosphates is unnecessary. It is recommended that ratoon canes, which received an adequate supply of pen manure as plant canes, should receive about 40 lb. of nitrogen per acre. This may be given in the form of 200 lb. of sulphate of ammonia or 250 lb. of nitrate of soda per acre, in one application.

St. Kitt's Agricultural and Commercial Society.

The St. Kitt's *Advertiser*, of December 19, contains a report of a meeting held on December 13 for the purpose of discussing the advisability of starting an Agricultural Society. A short report of this meeting will be found elsewhere in these columns.

The chair was taken by his Honour the Administrator, who said he thought that the island was losing a great deal by not having an Agricultural Society—a society to meet and discuss everything connected with agriculture, to endeavour to find the ways and means for central factories, and to make the best use of the island's resources. He had therefore called the meeting to ask the leading men of the island to express their views on the subject.

It was agreed that, as the agricultural and commercial interests of the island were so interwoven, the society should be called the 'St. Kitt's Agricultural and Commercial Society.'

Sir Robert Bromley was elected Patron of the Society, Mr. E. D. B. Dobridge, President, and Mr. E. S. deLisle, Vice-president, while Mr. F. R. Shepherd, Agricultural Superintendent, was appointed Secretary.

The Imperial Department of Agriculture will endeavour to co-operate with this newly formed society and to render it every assistance.

Agriculture in Grenada.

Elsewhere in these columns there is published a brief review, from the *Annual Report* on Grenada for 1904, of the agricultural industries of the colony. It will be seen that the cacao crop of 1904 was the largest on record, being 67,225 bags, or 7,564 bags in excess of the average for the last five years. The output of spices was less than in the preceding year.

In regard to the exports of cacao, it is mentioned that there is legitimate ground for a hopeful outlook for the future of the colony's main product on account of steady improvement in the French and American markets.

The quantity of sugar made is inadequate both in quality and quantity to the wants of the population, and both refined and muscovado sugar have to be imported.

Agriculture in the Bahamas.

The *Annual Report* on the Bahamas for 1904-5 briefly reviews the efforts of the recently established Board of Agriculture for the promotion of the agricultural interests of the colony.

Sea Island cotton seed was obtained from the United States and the Imperial Department of Agriculture and distributed in the out-islands. During the year the Board made experimental shipments of grape fruit and oranges to the United Kingdom and Canada.

In consequence of disquieting reports as to the exhaustion of the sponge beds, a Sponge Fisheries Board was appointed and has been engaged in obtaining information as to the regulation of the sponge fisheries on the coasts of Cuba and Florida.

The principal exports of the colony are sisal hemp, fruit, and sponges. The fruit consisted of pine-apples, oranges, and grape fruit. The values of the exports of these products in the year 1904-5 were: sisal hemp, £29,557; pine-apples, £22,616; oranges, £338; grape fruit, £1,374; and sponges, £105,718. There were also exported 65,250 cases of canned fruits, of the value of £13,124.

Exports of Trinidad.

It is stated in the *Annual Report* on Trinidad for 1904-5 that the year's sugar crop was a very short one, in consequence of a dry season. Owing, however, to good prices, the total value of the sugar exports show a large increase over that of the previous year's crop. It is satisfactory to observe that there has been increased activity in sugar cultivation, and there seems no doubt that sugar will continue to hold its own.

Cacao, in spite of low prices, continues to be by far the most important export, the value of the shipments in 1904-5 being £1,053,886, or nearly one-fourth of the total value of the colony's exports. Sugar stands second with £723,048.

The shipments of asphalt during the year (valued at £149,010) show a heavy decrease in value of £55,000, due largely to the recent conflict between various asphalt interests in the United States and the exploitation by them of rival sources of supply.

Produce Inspection at Bermuda.

The report has just been issued of a Commission appointed in Bermuda in July last to inquire into the causes of the unsatisfactory condition of the colony's export trade and to report what amendments should be made in the Produce Inspection Act, 1890.

The Commission found that the causes of the agricultural depression during the crop season 1904-5 were: (1) over-production; (2) holding back of the crop for better prices; (3) lateness of crop; (4) competition of Texan and Egyptian onions in the New York market; (5) low prices in that market; and (6) the state in which a large part of the produce, particularly onions, was shipped.

It is submitted that the first five of these causes can be dealt with only by co-operation and combination on the part of growers and shippers.

With regard to the last cause, the Commissioners 'are unanimously and clearly of opinion that, in the most important matter of the quality of onions and potatoes, legislation of an effective character would not only prove advantageous but is essential. . . We have therefore prepared a draft Bill dealing with the subject of produce inspection.'

The Commissioners further report that they are of opinion that 'it is only by a system which involves the infliction of punishments of various degrees of severity that inspection can be made effectual.'

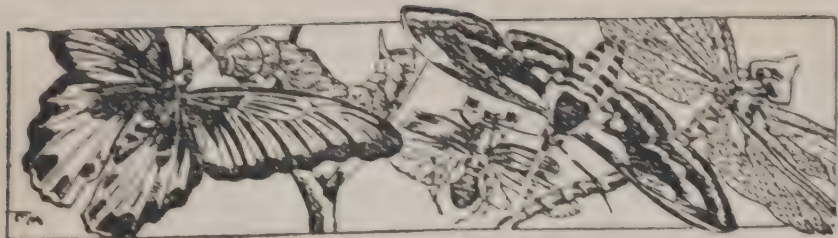
Lemons in Jamaica.

According to an interesting article in the December issue of the *Journal of the Jamaica Agricultural Society*, the growing of lemons has not, so far, proved profitable in Jamaica. It would appear that there are several reasons for this: first, the fruit has been shipped in the winter time, whereas the period of greatest demand is from April to September; secondly, the fruit has been shipped as it has been gathered from the tree, that is, without having undergone the necessary curing process. Jamaica lemons sent to the recent Colonial Exhibition were disposed of without difficulty and very favourably reported upon. Lemons sent to England in the right season would, it is stated, find a ready demand at from 10s. to 15s. per standard Florida case.

The lemon tree grows as well as the orange in Jamaica, where it thrives best on hill-sides. The blossoms should be encouraged to come in the autumn by picking off any flowers that come out at any other time.

'The lemons should be picked just when they begin to lose their greenness. They should then be put in a heap on the floor of the packing house and covered with blankets for a few days. Then wiped dry and packed.' The fruit must be carefully graded as to size.

In Sicily the fruit is sorted into three classes: (1) the largest, finest, and healthiest in appearance; (2) sound fruit of good quality; and (3) deformed, withered, and dwarfed fruit. The proportions falling into these three classes will vary according to locality, treatment of the trees, and the weather.



INSECT NOTES.

Cotton Insects in Cuba.

Mr. F. S. Earle, Director of the Agricultural Department of Cuba, writing to the *Havana Post* late in 1904 (see *Agricultural News*, Vol. III, p. 421) stated that the indications were that all the conditions in that island were favourable for cotton cultivation with one exception. The exception was the cotton boll weevil, which is supposed to be native to Cuba, and which was thought likely to prove very troublesome. It is understood that during the past season one company, which undertook the cultivation of cotton on a large scale in Cuba, found it impossible successfully to combat the cotton worm on account of the limited labour supply. This latter difficulty may be overcome as labourers become more accustomed to cotton as a crop, or by the introduction of labour from other sections of the island. It should, however, be always borne in mind that it will be impossible to cultivate cotton successfully unless a sufficient amount of reliable labour is to be had. In case of an outbreak of cotton worm, it is necessary to be able to apply poisons to the entire cotton area within two or three days. If this cannot be done, serious damage may result, as the cotton worm can cause a great deal of injury in that time.

The cotton boll weevil may or may not prove a serious obstacle to the cotton industry in Cuba. In Texas it has become the most serious menace to cotton growing, as it is likely to do in any country into which it may be introduced. Insect pests, almost without exception, cause far greater losses when imported into other localities than in the localities of which they are native. On this account the greatest care should be exercised that no cotton seed, seed-cotton, or lint, should be imported from any infested locality into these islands in which the boll weevil does not occur.

The cotton boll weevil is known to be present in Mexico, Guatemala, Cuba, and in Louisiana, and Texas in the United States. It has been reported to occur in Brazil and Africa, but these rumours have not been confirmed.

In the Philippines a species of weevil has been found which is different from the Mexican cotton boll weevil, but which attacks cotton in a very similar manner.

Paris Green and Lime.

During the past few years large amounts of Paris green have been used in the West Indies in combating the cotton worm. It has, for the most part, been applied to the cotton plants in the form of a dust in a mixture with dry, air-slaked lime. This mixture has been tried in varying proportions, and after considerable experience the Imperial Department of Agriculture decided that 1 lb. of Paris green to 6 lb. of air-slaked lime was the most satisfactory mixture to be used.

Cotton growers in Barbados have found that, with this mixture of Paris green and lime, the cotton worm is easily held in check at a very reasonable cost. It has been noticed that on estates where other proportions have been used (that is, 1 to 10 or even 1 to 20) the results have generally been less satisfactory, while the expense has been greater.

It has already been stated in the *Agricultural News* (Vol. III, p. 281) and in the *West Indian Bulletin* (Vol. IV, p. 328) that the lime is mixed with the Paris green principally for the purpose of enabling the overseer to see at a glance what the labourers have done, so that waste may be avoided, and, at the same time, no plants be skipped. In the Sea Islands and the Upland cotton districts of the United States, Paris green is used without any lime and is believed to be as cheap and effective as when used with the lime. This is not considered advisable in the West Indies, on account of the unreliable nature of the labourers, but it is considered to be an argument for the stronger mixture rather than the weaker.

It may be of interest to know that Paris green is about twice as heavy as lime, bulk for bulk: so that, if it is desired to mix these substances by measure, instead of having the trouble of weighing them, it will be found that a mixture at the rate of 1 lb. of Paris green to 6 lb. of lime may be made by using 1 measure of Paris green to 12 measures of lime.

SHADE-GROWN TOBACCO IN ST. KITT'S.

Mr. F. R. Shepherd, Agricultural Superintendent, St. Kitt's, has furnished the following information in regard to an experiment in growing tobacco under shade at the Botanic Station in St. Kitt's:—

The experiment at La Guerite with shade-grown tobacco comprises just about $\frac{1}{2}$ acre. The young plants were put out under the tent on October 18, and planted in rows 3 feet apart by 15 inches in the row. The plants grew most luxuriantly and those not topped grew to a height of 7 feet in two months.

On December 22, the first cutting of the ripe plants began and is steadily going on. So far, the experiment has been an entire success, but the curing of the shade-grown tobacco is rather more difficult than that of the sun-grown, and we can only hope that our best efforts will prove successful.

Besides the shade-grown tobacco, there is also $\frac{1}{2}$ acre grown in the open, which also gives promise of a good return. The very heavy yield of the shade-grown tobacco has somewhat taxed our curing accommodation, but I am converting the store-room into a temporary curing house, and so hope to be able to deal with the whole crop.

This experiment has attracted much attention here, and if the curing is a success—and every effort will be taken to make it so—I am sure that the planters will take it up on a larger scale.

MINOR INDUSTRIES IN BRITISH GUIANA.

In reviewing the agricultural operations of British Guiana for the year 1905, the *Demerara Advertiser* states:—

Very little progress can be reported in connexion with minor agricultural industries. The area devoted to rice cultivation is steadily extending. It is safe to estimate an area somewhere in the neighbourhood of 20,000 acres as being under rice cultivation at some period during the year.

This industry comes next to sugar as the most promising agricultural industry in the colony. The attempted resuscitation of the cotton industry has proved a complete failure. Some slight extension of the area devoted to cacao and coffee cultivation has taken place, and cocoa-nut cultivation has been considerably increased.

TOMATO GROWING IN JAMAICA.

The *Journal of the Jamaica Agricultural Society*, for December 1905, contains the following article by Mr. Robert Thomson, embodying the results of experiments in growing tomatoes in the Liguanea Plain, Jamaica. Mr. Thomson's experiences are likely to be of interest to many who grow this fruit in the West Indies:—

My object in taking up this culture was to demonstrate the practicability of growing this fruit on a large scale for export to England and America during the early spring months when prices are high.

In this cultivation, the first consideration is the propagation of an abundant stock of strong plants, established in nursery beds, for planting out in the field. Extreme care in growing the plants is of the utmost importance. Sow in boxes, a few hundred in each, in good soil. Place them in a partially shaded position, elevated a few feet above the ground in order to protect them from insects, etc. Soon after germination the seedlings are transplanted to well-prepared beds and dibbled in 4 inches apart. Shade the beds partially with cocoa-nut boughs or other branches, and water with care from a fine watering pan. When the seedlings are growing vigorously in the beds, withdraw the shade gradually and expose them to the sun a week or so before planting out in the field. Plant out in the open sunshine on a cool afternoon or cloudy day and water immediately.

The selection of varieties is important. The best varieties for the Liguanea Plain are Acme, Livingston Beauty, and Florida Prizetaker. But differences in soil, season, and climate render it advisable to test other varieties also. The individual grower should try several so as to determine the most suitable for his locality.

When cultivated on a commercial scale, the seeds can be grown as follows: Lines are marked out in the bed 6 inches apart, and not over $\frac{1}{2}$ inch in depth, and the seed distributed in the rows, averaging, as nearly as possible, four to the inch. If planted thicker, the seedlings should be thinned to this distance after they are up. The seedlings appear in a week.

My first experiment in growing tomatoes was at Maryfield, adjacent to King's House—from November to February 1901-2. I planted some 1,300 on $\frac{1}{4}$ acre. The land was ploughed, and abundant rain saturated the soil before planting. When about 18 inches high they were staked and tied to the stakes from time to time thereafter. The lateral shoots that sprang from the main stems were systematically pinched off, with the object of stimulating first production.

The first picking of the crop commenced within two months of setting out in the field, and the cropping season continued for over two months. The hotels and various passenger steamers purchased most of the crop at 3d. and 4d. per lb. The total amount realized from the $\frac{1}{4}$ acre was £40 10s., which is at the rate of £162 per acre, and this in four months from the time the seeds were sown. The actual cost of cultivation, including stakes, etc., was £3 15s., and sale expenses amounted to £2 17s. The net profit was therefore £33 18s. from the $\frac{1}{4}$ acre. Besides, many hundreds of pounds were lost consequent on the appearance of one of the diseases to which this plant is susceptible, that is, leaf mould or rust. The disorder was subdued by spraying with Bordeaux mixture.

My next trial of the culture was at the Constant Spring Hotel grounds. The result was extremely encouraging. The soil is a friable loam with a gravelly sub-soil. Only $\frac{1}{16}$ acre was planted here. The seeds were sown in December

last. After the plants were planted out, the soil was sometimes very dry, and the plants were frequently watered, the water being carried some 200 yards on women's heads. When tomato plants want water they present a parched appearance. The crop was disposed of to hotels, etc. The average price was 3d. per lb. The amount realized from sales was £25 9s. 11 $\frac{1}{2}$ d. The actual profit accruing was £20; a profit at the rate of £280 per acre.

I sent boxes of tomatoes that were grown at Maryfield to London, packed in a fibrous material. Mr. Stockley reported that they were received in 'wonderful' condition. The fruit was packed just when it was beginning to colour. The quality of the fruit, Mr. Withers, an expert on the subject, assured me, was equal to the best grown on the Canary Islands, whence England is supplied with vast quantities. When I came to this island about five years ago, I represented that there was a great future for tomatoes here. All that now remains to be done to add another industry to Jamaica is to grow and export tens of thousands of crates of tomatoes. Let it be borne in mind that the vast expansion of steamship traffic with Jamaica plays an important part in our welfare.

LEMON GRASS.

The following information in regard to lemon grass (*Andropogon citratus*), is extracted from an article in the *Tropical Agriculturist* for November 1905:—

The lemon grass is a large, coarse, greyish-green grass cultivated for its fragrant, lemon-scented essential oil. This oil, which is just now very valuable, is of a pale straw colour, with a dry, hot, burning taste and a pungent odour.

The chief uses to which it has been applied in Europe are in the perfuming of 'honey,' 'vinolia,' and other scented soaps, pomades, and greases; in the manufacture of perfumes such as 'Rhine violets'; in the preparation of 'Eau de Cologne' and other toilet waters, as well as in the adulteration of the 'otto of roses' and true verbena oil.

Although the wild grass is still the chief source of manufacture of the oil, the comparatively cleaner cultivated product, obtained from plantations in Ceylon and other countries, is coming to be utilized for the purpose more and more.

The requirements of the grass are few and simple. It is indifferent to all soils except the most rocky, sandy, or water-logged. It grows equally well in all atmospheres that do not develop conditions favouring the formation of frost or prolonged drought. The most suitable soil, however, is an arenaceous clay, and the best climate that which presents distinct alternations of sunshine and shower.

Lemon grass admits of free culture from offsets obtained by dividing clumps of the mature grass. The offsets are best when they are planted out 2 inches deep, at distances of 2 feet from one another in regular lines 3 feet apart. Under this method an acre would hold as many as 7,260 plants.

The grass will be ready for cutting, for the first time, in the cold weather of the third year from planting out. Lemon grass dries quickly after cutting and, to secure the best results, it ought to be committed to the still directly it is harvested.

The yield of oil varies considerably with soil, climate, and general treatment. But, generally speaking, with only two crops in the year, the output per acre would amount to about 5,000 bundles (of 6-inch diameter) capable of yielding at least 100 quarts of oil. As 40 fluid oz. are contained in a quart, and an ounce of refined lemon grass oil sells in Europe for at least 6d., the product of an acre would, at this rate, realize a value of £100.



GLEANINGS.

The *Port-of-Spain Gazette*, of December 30, states: 'From general inquiries we gather that this is the heaviest year for cacao export that has been known for a long time. Apart from quantity, the quality, too, is exceptional.'

The following items occur in the list in the *Annual Report* for 1904-5 of the exports from St. Vincent: Cassava starch, £1,379; vegetables, £2,340; ground nuts, £1,258; farine, £343. All the above-mentioned items show decided increases as compared with the values for 1903-4.

The tobacco industry in Southern Rhodesia is considered to have passed the experimental stage, and various qualities of leaf are securing a steady sale locally, the tobacco grown from Turkish seed having already established a good reputation. (*Tropical Life*, December 1905.)

Sea Island cotton with perfect preparation and selected staple has brought full prices during the week; but poorly prepared grades, with ordinary staple, have been sold at a slight discount. Lower grades have been in request all the week. (*Cotton Trade Journal*, Savannah, Georgia, December 9, 1905.)

'The quantity of ground provisions imported into Grenada during 1904 has been of sufficient volume to justify their separate inclusion in the statement of imports. These provisions nearly all come from St. Vincent and Barbados. The value of the imports of ground provisions in 1903 was £309; in 1904, £843.' (*Annual Report on Grenada*.)

At a meeting of the West Indian Committee of the British Cotton-growing Association held on December 8, 1905, says the *Textile Mercury*, it was reported that five different samples of the new crop coming forward from St. Vincent had been received, and, with one exception, these were pronounced to be the best samples of cotton yet received from that island.

In reference to the note in the *Agricultural News* (Vol. IV, p. 396), it may be mentioned that an opportunity was recently given to the members of the Antigua Agricultural Society to visit the Botanic Station. The company was conducted through the station by Dr. Watts and Mr. Jackson (the Curator) who directed attention to many objects of interest. From the Botanic Station the members proceeded to the Cotton Factory, and afterwards visited the Experiment Plots at Skerretts. This example might be followed in other islands, as it is likely to do good in increasing the usefulness of the work of the Imperial Department of Agriculture.

The exports of sugar from British Guiana for the year will amount to, approximately, 113,000 tons. The quantity of sugar on hand unshipped at date is less by about 7,000 tons than the quantity on hand on December 31 last year. The exports for the previous three years were: 1904, 108,137 tons; 1903, 132,916 tons; 1902, 121,230 tons. (*Demerara Argosy*, December 30, 1905.)

A correspondent in Dominica writes: 'Is there any known objection to planting *Coleus* among cacao? One particular kind grows most profusely here and will greatly help to keep down the grass. I do not care to try it without first hearing if it is likely to prove more injurious than the grass.' It would be interesting to have the observations of readers of the *Agricultural News* on this point.

From the official returns showing the quantities and values of the exports from Jamaica during the quarter ended September 30, 1905, it appears that very satisfactory increases are recorded for annatto, bees'-wax, honey, coffee, divi-divi, bananas, cocoa-nuts, and oranges. The exports of ginger, kola nuts, lime juice, pimento, rum, and sugar during the quarter show decreases as compared with the corresponding period of 1904.

Some time ago it was announced that the Canadian refiners would pay for British West Indian sugar the price at which it was selling in New York, thus preventing the growers from participating in the preference accorded by the Dominion tariff. An intimation has, however, been received from Messrs. Pickford & Black, of Halifax, N.S., that the Canadian refiners will accept all sugars on the same terms as last year.

In an article on the Jamaica coffee industry, the *Journal of the Jamaica Agricultural Society* says: 'The preservation of our coffee industry lies in the moderate-sized and large plantations which grow coffee on the best lines, and also buy from the smaller people around, curing it with the best ability available. What is wanted is careful growing, careful picking, careful pulping, careful fermentation, careful washing, careful curing, careful drying, and, most of all, careful despatch.'

The *Jamaica Daily Telegraph*, of December 16, 1905, has the following: 'A rarity in the way of bananas was produced on an estate near Richmond a short time ago. The rarity consists of a stalk on which there are two bunches of bananas with four navels protruding from the stalk. Many of the fruit men on the north side say that it is the first time they have seen such a freak in the way of bananas.' It may be mentioned that a similar freak was figured in the *Agricultural News* (Vol. II, p. 245).

According to the *Annual Report* on Trinidad for 1904-5, 'those best qualified to form an opinion consider that an oil field of considerable importance underlies the surface of a large portion of the colony, the oil-bearing beds being well defined at various depths from the surface. Other industries, such as the mining of manjak, are being prosecuted with success, and the fact that Trinidad possesses so many subsidiary sources of prosperity is a potential ground for believing that her present progress will be maintained and increased in the future.'

WEST INDIAN PRODUCTS.

Drugs and Spices in the London Market.

The following report on the London drug and spice market, for the month of November 1905, has been received from Mr. J. R. Jackson, A.L.S.—

The month commenced with a moderate amount of activity in most articles, which, however, declined towards the end of the month, when a slow demand prevailed throughout most of the offerings. Perhaps the most notable article offered, as to bulk, at any one auction, was senna, over a thousand bales of which were catalogued on the 9th.

GINGER.

At the spice sale on the 1st. of the month there was a steady demand for Jamaica, which sold at 41s. to 43s. for fair to good common, and 38s. 6d. for small. Medium cut Cochin was bought in at 55s. and smallish to fair native cut at from 37s. 6d. to 45s.; 31s. was realized for small cut tips, and 20s. for fair washed rough. A week later, the prices stood slightly higher for Jamaica. On the 22nd., some 75 barrels of Jamaica were offered, 30 of which were sold at 36s. to 38s. for common. At this sale, at which the demand was very slow, some selected bold Cochin was offered and bought in at 100s.

NUTMEGS, MACE, PIMENTO, ETC.

Both in nutmegs and mace steady prices at usual rates were maintained throughout the month with, perhaps, a slightly lower tone. Good pimento at the first sale realized $2\frac{1}{2}d.$; at the second sale on the 8th., ordinary sold at from $2\frac{3}{8}d.$ to $2\frac{7}{16}d.$, and fair $2\frac{1}{2}d.$, which prices were maintained to the end of the month.

At the weekly spice sale chillies were offered at the following rates: On the 1st. good bright Nyassaland 38s. 6d., and fair red and yellowish, 34s. 6d. to 35s.; large red Japanese were bought in at 36s. per cwt. A week later good Nyassaland were disposed of at 33s., and good Mombasa at 34s. Fine bright East African capsicums were sold at 54s. At the last sale, on the 22nd., the prices had somewhat declined.

SARSAPARILLA.

The sales opened on the 2nd. of the month with the report that the market was practically cleared of grey Jamaica and Lima-Jamaica from first hands. A week later, 1 bale of good red native Jamaica was offered and sold at 1s. 1d. per lb., and $9\frac{1}{2}d.$ was paid for two bales of sea-damaged. No other kinds were offered at this sale, but on the 16th. it was reported that 12 bales of genuine grey Jamaica, 6 large bales of red native Jamaica, and 12 bales of Guayaquil had arrived during the week. These were offered at the auction on the 23rd., realizing for grey Jamaica, 1s. 5d. to 1s. 7d. for ordinary coarse dark to good fibrous, while for 5 bales of native red Jamaica from 10d. to $11\frac{1}{2}d.$ was obtained, and for sea-damaged 9d. Lima-Jamaica was quoted privately at 1s. 3d., and coarse chumpy Guayaquil at 1s. to 1s. 1d. per lb.

KOLA, LIME JUICE, TAMARINDS, ETC.

Of other West Indian products it may be stated that at the second sale in the month 8 packages of fair West India kola nuts were disposed of at from 3d. to $3\frac{1}{4}d.$ per lb., Java being privately quoted at the same sale at $4\frac{1}{2}d.$ to 5d. per lb., c.i.f. A week later there was an abundant supply

in the market, fair bright Jamaica fetching 3d., and damaged $2\frac{1}{2}d.$ Sixty-three bags of West Indian, which had arrived via Halifax, were bought in at $3\frac{1}{2}d.$ Lime juice was offered on the 8th. of the month, 4 puncheons of fair raw Jamaica fetching 10d. per gallon, and at the same sale 6 cases of West Indian distilled oil of lime were sold at from 1s. 4d. to 1s. 5d. per lb.

On the 15th. tamarinds from Barbados and Antigua were sold: the former at 17s. per cwt. in bond, and the latter, more or less sour, at 14s. At the last sale some fair bold to lean *Cassia Fistula* pods realized 20s. 6d. per cwt. Good bright Madras annatto seed was offered at $6\frac{1}{2}d.$ to 7d. per lb., and some dark, over-dried Tripoli strip orange peel was sold at $3\frac{1}{2}d.$ per lb.

There has been no demand for arrowroot notwithstanding that quantities of fair manufacturing St. Vincent have been offered, all of which has been bought in.

Canada.

The following is an extract from a letter addressed to the Imperial Commissioner of Agriculture, under date December 12, 1905, by Mr. J. Russell Murray, of Montreal, in reference to West Indian trade with Canada:—

TARIFF COMMISSION.

The Commission sat in Montreal on November 10, and contrary to expectations, no representatives appeared from the West Indies relative to the Preferential Tariff for the British West Indian sugar. The question of the alteration of the colour standard was brought before the Commission by the undersigned, by an application for the raising of the standard from 16 d.s. to 19 or 20 d.s., with the object of admitting the better classes of grocery sugar now being made throughout the British West Indies on a reasonable basis. The present tariff was framed to meet conditions now much improved upon, and has become an obstruction to the reasonable importation of a most useful grade of household sugar.

ORANGES.

Jamaica oranges have had the poorest season for several years; this, by general consent, being caused solely by the poor quality of fruit sent to market. The early shipments were sour and green and stopped the sale, forcing buyers to look elsewhere for supplies, and during the last two weeks fine, sweet oranges have been arriving from Mexico, Florida, California, and Valencia, entirely supplanting Jamaica and Dominica fruit. Prices for Jamaica are now at \$2.90 to \$3.10, duty paid.

MOLASSES.

The trade remains exceedingly quiet for importers. Wholesale firms report slow deliveries, and prices are, on the whole, easier.

COCOA-NUTS.

Business is wholly confined to the manufacturing interests; prices remain steady at late rates.

SPICES.

A fairly good trade has been moving in these lines. Pimento, however, is quiet and weaker in price. Grenada nutmegs are steady in value and demand. Ginger is steady at unchanged prices.



THE GUINEA FOWL.

The following article on the Guinea fowl appeared in the *Journal of the Board of Agriculture*, London, for December last. Considerable numbers of these birds are kept in the West Indies, and it is likely that this information will prove of value, as it contains some very useful hints as to the best methods of dealing with Guinea fowl:—

The Guinea fowl is more generally kept for ornament than as a utility fowl, and its merits for the latter purpose are apt to be lost sight of. It is, however, one of the most active foragers of all birds that can be kept on a farm, and the cost of keeping it, compared with other kinds of poultry, is small. The gross profits which it yields may not be as large as those from fowls, ducks, or turkeys, but the net profits are not unsatisfactory, as it is largely self-supporting.

It is particularly hardy, and generally sleeps in the trees about a farmyard rather than in a house. In this way it is free from restraint, and is able to spend the early hours of the morning in foraging for food. There is no better gleaner than the Guinea fowl, and it will wander as much as a mile from home, but as it is chiefly insectivorous, it does scarcely any damage to crops, and the benefits which it confers by ridding the fields of insect pests undoubtedly outweigh any slight injury caused in this way. It is well able to take care of itself, and there is little danger of its being killed by a fox, while its homing instinct is well developed, and it may be relied upon to come home to roost at night. The Guinea fowl, therefore, requires little of the care and special management that must necessarily be given to other domestic poultry, as, if given free range, it will during the summer find almost all the food it requires.

EGG LAYING.

Guinea fowls do not lay in the winter, but during spring, summer, and autumn they lay a number of eggs. Starting, as a general rule, in April, they lay without intermission daily for perhaps a month, and if the eggs are removed from the nest as they are laid the hens will continue for perhaps three months without becoming broody. If they remain in the nest and want to sit, it is only necessary to take away the nest-eggs and break up the nest, and within a week the hen will start to lay again in another place. Even the tamest birds seem to dislike laying indoors, and it is almost impossible to induce them to lay in hand-made nests. They prefer to make their own nests in secluded places, where they are well screened from view by bushes or weeds. So cleverly is the nest concealed that it is sometimes difficult to find, but when leaving the nest the hen utters a long and peculiar cry, which is not heard at any other time, and by this means the whereabouts of the nest can be located.

It has been stated that the Guinea cock is monogamous, but this is not strictly correct—though in order to secure fertile eggs it is best to keep equal numbers of cocks and hens. If there are many eggs in a nest at the time it is discovered, they should be taken away a few at a time, for

whilst the Guinea hen may not be able to count, she can see the difference in the nest if, say, a dozen eggs are taken away at once and only one or two left as nest-eggs. But if the number is gradually reduced from a dozen or a score to one or two, the difference is not detected, and the hen does not forsake the nest. The hen will desert the nest, however, if it is considerably disturbed, or if the surrounding weeds or bushes are trampled.

The eggs are about two-thirds the size of the ordinary hen's egg, but of excellent flavour. It is important, however, that they should be fresh, as contact with the earth or grass in a nest will after some days give them a most objectionable taste; it is therefore necessary to gather the eggs daily.

HATCHING.

The eggs take from twenty-six to twenty-eight days to hatch, and as it is desirable to have the chicks hatched as early in the year as possible, it is advisable to set the eggs under ordinary hens. If the Guinea hen hatches her first nest of eggs she will not lay again for the season, but she may be kept laying to September, or later, by preventing her from hatching. It is then too late to hatch Guinea eggs, for late-hatched chicks will seldom live through the winter, and even if they should survive they remain small and of little use for marketing in February or March, which is the season for Guinea fowls. A barn-door hen of average size can hatch about twenty eggs, and when the chicks are hatched their foster-mother cares for them in a more satisfactory manner than the Guinea hen would, for the common hen is more tractable, and can be kept with her brood in a limited space.

CARE OF THE CHICKS.

The chicks leave the shell very soon after the appearance of the first chip, and almost immediately they are inclined to stray. In this way some may be lost unless a close nest-box is provided. For the same reason it is necessary to attach a closely-wired run to the coop, in which the chicks are put after they are hatched. For rearing the chicks a combined coop and run has been found most convenient. This may be cheaply made of boards and wire netting about 5 feet long, 2½ feet wide, and 2 feet high. This should be divided into two parts, making a coop or sleeping compartment 2½ feet by 2 feet, and a run of 2½ feet by 3 feet. The sides of the run may be of ½-inch wire netting, the sides of the coop being closely boarded. A slatted partition should divide the two sections, the whole being covered by a span roof of thin boards.

FEEDING THE CHICKS.

The chicks may be left in the nest until they are about twenty-four hours old, and they can then be removed to the coop and fed for the first time. Owing to their liability to stray, the chicks must be kept within the confines of the coop and run until they become accustomed to the mother's call, but afterwards they may be given more liberty. When newly hatched the chicks may be fed on any patent chicken meal, moistened with milk and raw whipped eggs. They should also get green food from the start, and the best kind is chopped onions or leeks, but lettuce, dandelion, etc., may also be used to advantage. When the chicks are a few days older plainer foods may be freely used, and one of the most wholesome is coarse oatmeal fed dry. This may be varied by the occasional use of boiled rice, raw rice meal, hemp seed, millet seed, etc. At a later stage, say, when three or four weeks old, some middlings and fine barley-meal may be added to the mash. Grit of fine quality must be regularly supplied from the time the chicks leave the shell.

VALUE OF INSECT FOOD.

There is nothing so wholesome for the chicks as insect food. Dried ants and ants' eggs are often used by those who rear pheasants and Guinea fowls, but in many districts, especially where the soil is sandy, there are ant-hills in the fields. In such farms it is only necessary to place the coop in which they are kept near an ant-hill and the chicks will feed greedily on the insects and their eggs. It is worth while to have a light coop with a wire bottom made and the hen and chicks can be placed in this and laid over an ant-hill which has previously been stirred up and levelled with a spade.

Young Guinea fowls are naturally insectivorous, and when hatched out in the woods and fields they live very largely on flies, grasshoppers, moths, and grubs of all kinds. These being their natural foods, the more of them that can be given to the chicks in a state of domestication the healthier they will be. It is therefore advisable that when a few weeks old the chicks should be given a free run with the old hen, and the best kind of range for them is an overgrown, weed covered garden, orchard, or shrubbery. In such a place they can find as much insect food as they need to keep them in health; but if the run is small, or if too many birds are kept on it, it becomes necessary to feed Guinea chicks with a small quantity of meat in their mash. One of the prepared meat foods or finely chopped fresh meat and fresh bone may be used.

For table use Guinea fowls are but little inferior to the pheasant. The flesh is somewhat dark, but has a decided gamey flavour, and is appreciated when game is out of season.

AGRICULTURE IN BARBADOS.

The *Annual Report* on Barbados for the year 1904-5, dated August 31, 1905, deals with the agriculture of the colony as follows:—

The customs returns show that 63,604 hogsheads of sugar and 45,061 puncheons of molasses were exported during 1904, the value of the crop being estimated at £584,403—a considerable improvement on the years 1902 and 1903.

The cotton and banana industries, which owe their existence to the initiative of the Imperial Commissioner of Agriculture, have continued to thrive under the guidance of that Department. It is estimated that some 300,000 lb. of cotton will this year be shipped from the 1,647 acres which are under cultivation. The price obtained for the cotton continues to be favourable, and the industry may now be considered to be established here with a fair promise of success. The data obtained from ten estates, each having an average of $9\frac{1}{2}$ acres under cotton cultivation, show that during 1904 the average net return per acre was £10 8s. 4d.

It is now proposed to hand over the cotton factory, which has hitherto been worked under the combined management of the Agricultural Society and the Imperial Department of Agriculture with funds advanced from the colonial treasury, to a local company, and the Government has agreed to transfer to the company its interest in the factory in return for £600, first mortgage debenture bonds, bearing interest at the rate of 3 per cent. per annum. The new company will work the factory on co-operative lines, and the maximum charge for ginning and baling will be 1d. per lb.

The banana industry has grown from eighteen bunches shipped in 1902 to 15,326 bunches shipped in 1904, and it

is estimated that at the present time there are about 100 acres of land planted in bananas and that 40,000 bunches will be shipped during 1905. The difficulties in connexion with the package and carriage of the fruit appear to have been successfully overcome, and it has been estimated that the industry should give a net return of £20 an acre per annum. The Cavendish or dwarf banana is the variety which can be shipped with the best results.

The exhibit of fruit and vegetables from this and two other West Indian Colonies obtained a certificate and gold medal at the Royal Horticultural Society's exhibition held in December last. By the kindness of the West India Committee, who made all arrangements in connexion with the exhibit, this colony was presented with a duplicate of the medal.

A sum of £400 was voted by the Legislature to meet the expenses of sending an exhibit from the colony to the Colonial and Indian Exhibition, held this year at the Crystal Palace. A very creditable collection of articles was made, and, thanks to the kind assistance rendered in the matter by the West India Committee, it is hoped that considerable material advantage may result to the colony from this exhibit of its resources.

RAT VIRUS.

The following is extracted from an article in the December issue of the *Journal of the Jamaica Agricultural Society*:—

There are no greater enemies to agricultural operations than rats. They eat the seed when planted in the ground; they eat the crops of grain when it is ripe; they eat cacao pods and coffee berries; they follow the crops into the store-room and eat the corn there; they are a pest in the house as well as out of the house; they are omnivorous, eating everything and anything. For every one chicken eaten by mungoose a hundred are taken by rats; they go into the nests of birds and eat the eggs and, but for the mungoose, would increase to a dangerous extent. Before the introduction of the mungoose sugar estates spent hundreds of pounds annually on rat catching. Thousands of pounds have been lost in the island by the devastation of rats on cacao pods and coffee berries, more especially the former. To use poison is always dangerous, for domestic stock may get at the poisoned bait or eat the poisoned rats, and in buildings the smell of dead rats is not only obnoxious but unhealthy. The introduction of a rat virus, which is only fatal to rats and mice and does no harm to human beings or domestic stock in any way, is of great value to us. It is natural that people may not adopt the use of this virus freely at once until it has been proved effective. A reference to the advertisements in this journal will show that some cacao planters have found it most useful and most effective in destroying the rats that did damage in their cacao walks.

After referring to the successful use of rat virus in Dominica, as reported in the *Agricultural News* (Vol. IV, p. 319), the article continues:—

There have been some failures with this virus due to the fact, probably, that it had lost its vitality. It will not stand heat, and so is imported on ice and should be used at once, as it cannot be kept except in a cool place. We have used this virus with good effect in this office, and we advise all planters who are growing corn to use it when they are planting their corn, and three to four months later again when the corn is ripening in the field.

MARKET REPORTS.

London,—December 22, 1905. Messrs. KEARTON, PIPER & Co.; Messrs. E. A. DE PASS & Co.; 'THE WEST INDIA COMMITTEE CIRCULAR,' 'THE LIVERPOOL COTTON ASSOCIATION WEEKLY CIRCULAR,' December 15, 1905; and 'THE PUBLIC LEDGER,' December 16, 1905.

ALOES—Barbados, 15/- to 60/-; Curaçoa, 17/- to 75/- per cwt.
ARROWROOT—St. Vincent, 2d. per lb.
BALATA—Sheet, 1/4 to 1/11; block, 1/4 to 1/4½ per lb.
BEES'-WAX—£7 17s. 6d. per cwt.
CACAO—Trinidad, 52/- to 60/- per cwt.; Grenada, 46/- to 52/- per cwt.

CARDAMOMS—Mysore, 7½d. to 3/- per lb.
COFFEE—Jamaica, good ordinary, 38/- to 40/- per cwt.
COTTON—West Indian, medium fine, 6·85d.; West Indian Sea Island, medium fine, 13d.; fine, 14d.; extra fine, 15½d. per lb.

FRUIT—
BANANAS—Jamaica, 4/6 to 7/- per bunch.
GRAPE FRUIT—7/- to 10/- per box.
LIMES—4/- to 4/6 per box.
ORANGES—Jamaica, 8/3 to 11/- per box of 176-200.

FUSTIC—£3 5s. to £4 per ton.
GINGER—Jamaica, 42/- to 53/- per cwt.
HONEY—20/- to 25/- per cwt.
ISINGLASS—West Indian lump, 2/1 to 2/5; cake, 1/- to 1/4 per lb.

KOLA NUTS—4d. to 6d. per lb.
LIME JUICE—Raw, 9d. to 1/- per gallon; concentrated, £16 per cask of 108 gallons; hand-pressed, 2/3 to 2/6 per lb. Distilled Oil, 1/4½ to 1/5 per lb.

LOGWOOD—£4 to £4 15s.; roots, £3 10s. to £4 per ton.
MACE—Fine pale, 2/4; fair to good pale, 1/4 to 1/6; red, 1/- to 1/3 per lb.

NITRATE OF SODA—Agricultural, £11 2s. 6d. per ton.
NUTMEGS—70's, 10d.; 83's, 9d.; 90's, 7½d.; 101's, 6d.; 116's, 5½d.; 125's, 4½d. per lb.

PIMENTO—Fair, 2½d. to 2½d. per lb.
RUM—Demerara, 1/1 to 1/2½ per proof gallon; Jamaica, 2/1 per proof gallon.

SUGAR—Yellow crystals, 14/- to 17/3 per cwt.; Muscovado, 15/- to 15/6 per cwt.; Molasses, 11/- 16/- to per cwt.
SULPHATE OF AMMONIA—£12 10s. per ton.

Montreal,—December 12, 1905.—Mr. J. RUSSELL MURRAY. (In bond quotations, c. & f.)

COCOA-NUTS—Jamaica, \$27·00 to \$29·00; Trinidad, \$24·00 to \$25·00 per M.

COFFEE—Jamaica, medium, 10c. to 11c. per lb.

GINGER—Jamaica, unbleached, 7½c. to 10c. per lb.

MOLASCUIT—Demerara, \$1·00 per 100 lb.

MOLASSES—Barbados, 30c.; Antigua, 26c. per Imperial gallon.

NUTMEGS—Grenada, 110's, 18c. per lb.

ORANGES—Jamaica, \$2·65 per barrel, duty paid.

PIMENTO—Jamaica, 5¼c. per lb.

SUGAR—Grey crystals, 96°, \$2·12 to \$2·20 per 100 lb.

—Muscovados, 89°, \$1·60 to \$1·75 per 100 lb.

—Molasses, 89°, \$1·35 to \$1·50 per 100 lb.

—Barbados, 89°, \$1·45 to \$1·70 per 100 lb.

New York,—December 22, 1905.—Messrs. GILLESPIE BROS. & Co.

CACAO—Caracas, 12c. to 12½c.; Grenada, 10½c. to 11c.; Trinidad, 11¼c. to 11¾c.; Jamaica 9¾c. to 10½c. per lb.

COCOA-NUTS—Jamaica, \$23·00 to \$25·00; and Trinidad, \$22·00 to \$25·00 per M.

COFFEE—Jamaica ordinary, 8¼c. to 10½c. per lb.

GINGER—Jamaica, 7c. to 9½c. per lb.

GOAT SKINS—Barbados, Dominica, and Jamaica, 58½c.; St. Kitt's, 51c. per lb.

GRAPE FRUIT—Jamaica, \$4·00 to \$6·00 per barrel; \$3·00 to \$3·50 per box.

HONEY—Jamaica—No quotations.

LIMES—No quotations.

MACE—27c. to 31c. per lb.

NUTMEGS—West Indian, 70's to 80's, 20c.; 105's to 110's, 13c.; 115's to 130's, 10c. per lb.

ORANGES—Jamaica, \$4·00 to \$4·25 per barrel; \$2·00 to \$2·50 per box.

PIMENTO—4¾c. per lb.

PINE-APPLES—No quotations.

SUGAR—Centrifugals, 96°, 3½c.; Muscovados, 89°, 3½c.; Molasses, 89°, 2¾c. per lb.

INTER-COLONIAL MARKETS.

Barbados,—January 6, 1906.—Messrs. T. S. GARRAWAY & Co., and Messrs. JAMES A. LYNCH & Co., December 30, 1905.

ARROWROOT—St. Vincent, \$3·80 to \$4·25 per 100 lb.

CACAO—\$9·00 per 100 lb.

COCOA-NUTS—\$11·00 per M. for husked nuts.

COFFEE—\$10·50 to \$11·00 per 100 lb.

HAY—\$1·00 per 100 lb.

MANURES—Nitrate of soda, \$65·00; Ohlendorff's dissolved guano, \$55·00; Cotton manure, \$48·00; Sulphate of ammonia, \$75·00; Sulphate of potash, \$67·00 per ton.

ONIONS—Madeira, \$2·75 per 100 lb.

POTATOS, ENGLISH—Nova Scotia, \$2·40 to \$3·60 per 160 lb.

RICE—Ballam, \$4·20 to \$4·35 per bag (190 lb.); Patna, \$3·15 to \$3·25; Rangoon, \$2·65 to \$2·75 per 100 lb.

British Guiana,—January 3, 1906.—Messrs. WIETING & RICHTER.

ARROWROOT—St. Vincent, \$8·00 per barrel.

BALATA—Venezuela block, 25c.; Demerara sheet, 38c. per lb.

CACAO—Native, 12½c. per lb.

CASSAVA STARCH—\$4·50 per barrel.

COCOA-NUTS—\$10·00 to \$12·00 per M.

COFFEE—13¼c. to 13¾c. per lb.

DHAL—\$4·65 to \$4·70 per bag of 168 lb.

EDDOES—\$1·68 to \$1·80 per barrel.

ONIONS—Lisbon, 3c. per lb. (ex store).

PLANTAINS—20c. to 40c. per bunch.

POTATOS, ENGLISH—\$2·60 to \$3·00 per barrel.

POTATOS, SWEET—Barbados, \$1·20 per bag.

RICE—Ballam, \$4·35 per 177 lb.; Creole, \$4·00 per bag (ex store).

SPLIT PEAS—\$5·80 per bag (210 lb.).

TANNIAS—\$1·00 per barrel.

YAMS—White, \$1·68; Buck, \$2·40 per bag.

SUGAR—Dark crystals, \$1·95 to \$2·00; Yellow, \$2·50 to \$2·65; White, \$3·75 to \$4·00; Molasses, \$1·75 to \$2·00 per 100 lb. (retail).

TIMBER—Greenheart, 32c. to 55c. per cubic foot.

WALLABA SHINGLES—\$3·00, \$3·75, and \$5·25 per M.

Trinidad,—January 5, 1906.—Messrs. GORDON, GRANT & Co.; and Messrs. EDGAR TRIPP & Co.

CACAO—Ordinary to good red, \$11·00 to \$11·10; estates, \$11·25 to \$11·40 per fanega (110 lb.); Venezuelan, \$12·00 to \$12·50 per fanega.

COCOA-NUTS—\$21·00 per M., f o.b.

COCOA-NUT OIL—72c. per Imperial gallon (casks included).

COPRA—\$2·90 to \$2·95 per 100 lb.

DHAL—\$3·20 to \$3·25 per 2-bushel bag.

ONIONS—\$1·60 to \$1·70 per 100 lb. (retail).

POTATOS, ENGLISH—60c. to 70c. per 100 lb.

RICE—Yellow, \$4·25 to \$4·40; White, \$5·00 to \$5·60 per bag.

SPLIT PEAS—\$5·20 per 2-bushel bag.

SUGAR—White crystals, \$4·50; Yellow crystals, \$2·75 to \$3·00; Molasses, \$2·75 to \$3·00 per 100 lb.



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Barbados Cotton Industry.

ACCORDING to the returns furnished by the Comptroller of Customs during the quarter ended December 31, 1905, there were exported from Barbados, 167 bales and 7 bags of

cotton, weighing 69,234 lb., of the estimated value of £3,462.

If to these figures are added the exports for the nine months ended September 30 last, published in the *Agricultural News* (Vol. IV, p. 343), the total exports from Barbados for the year 1905 are as follows: 958 bales and 9 bags, containing 344,232 lb., of the value of £17,212.

This, it will be admitted, is a gratifying result for an industry scarcely four years old, and reflects great credit on those who have taken up cotton growing in so earnest and successful a manner, and carried out so fully the advice tendered to them by the Officers of the Imperial Department of Agriculture. It is hoped to refer, at a later date, to the results obtained during the year 1905 at St. Vincent and the Leeward Islands.

In the above returns for Barbados it will be noticed that the value of the cotton lint only is given. In order to estimate the real value of the industry we must take into account also the value of the seed. It has been found by experience during the last three years, that from every 100 lb. of seed-cotton there are usually obtained 29 per cent. of lint, and 71 per cent. of seed. The quantity of seed obtained from the seed-cotton yielding 344,232 lb. of lint would therefore be 842,774 lb. This seed, if sold to the Oil Factory at \$24·00 (£5) per ton, would realize £1,888 3s. 10d., making the total return for lint and seed obtained at Barbados during 1905, £19,093 3s. 10d. If the seed were exported to the United Kingdom or elsewhere, the net proceeds per ton would probably be less than \$24·00 and, moreover, the land would be robbed of a valuable fertilizer and its yielding qualities reduced.

On the other hand, if the seed were ground into meal and fed to stock, or if the seed were delivered to the Factory on condition that \$5.00 were paid for the oil contained in every ton of seed, and the resulting cake or meal weighing, say, 1,800 lb., were returned to the grower, the latter would derive full value for his produce.

It is desirable to mention that in estimating the export value of the lint, the Customs authorities place this at 1s. per lb. It is well known that during the past year, Barbados cotton has sold for 1s. 1d. to 1s. 3d. per lb. At an average price of 1s. 2d. per lb., the value of the cotton lint exported during 1905 would be £20,084 4s. 0d. If, however, the seed were known to be of good quality and in demand for planting purposes, it is probable that at least one-sixth of it would sell at 1½d. per lb., realizing £877 17s. 9d., while the balance at \$24.00 per ton would realize £1,567 13s. 3d. It would not be wrong, therefore, to assume that the total value of the cotton crop reaped at Barbados for the year 1905 was not far short of £22,530. The details are as follows:—

344,232 lb. Lint, at 1s. 2d. per lb.	=	£20,084	4	0
140,462 lb. Seed, at 1½d. „ „	=	877	17	9
702,312 lb. „ at £5 per ton	=	1,567	13	3
Total		£22,529	15	0

There is every indication that the crop of 1906 will show an increase of 30 to 40 per cent. on that of 1905, and prices promise to be good for all really first-class cotton.

As already pointed out by Mr. J. R. Bovell (*Agricultural News*, Vol. IV, p. 278), the cotton industry could be extended and maintained in a high state of efficiency on many lowland estates in this island without interfering with the sugar industry. This might be done by adopting a system of rotation of crops. At St. Kitt's, where cotton is grown on sugar estates as a catch crop (*Agricultural News*, Vol. IV, p. 102), the estimated clearance is placed by Mr. Arthur M. Lee at £5 17s. 7d. per acre.* At Barbados, growing cotton as a catch crop may not be practicable. The rotation suggested by Mr. Bovell in this island is as follows: (1) sugar-cane; (2) sweet potatoes; (3) cotton, and (4) Indian corn; to be followed again by sugar-cane commencing a new series.

For instance, if the canes were reaped in February to April 1906, sweet potatoes could be planted in August or September following. The potatoes would probably

* In a subsequent note (*A.N.*, Vol. IV, p. 140) Mr. Lee reduced this to £5 7s. 7d. per acre.

be ready to be taken off early in 1907. As soon as this were done, the land could be manured and planted in cotton in June 1907, and remain under that crop until the early months (March or April) of 1908, when the cotton bushes should be removed and burned. The land could then be planted with Indian corn. When the latter crop has been reaped, the land, well prepared and manured, could again be planted in sugar-cane in November and December of the same year.

It would be useful if this or some other system of rotation that might be suggested by those experienced in growing both canes and cotton were brought up for discussion at a meeting of the Barbados Agricultural Society.

In any case, it is hoped that those engaged in cotton growing will continue to devote the closest attention to all the details of cultivation, that they will deal promptly and effectively with the cotton worm and other pests, and steadily bear in mind that if the island is to maintain its present high character for the production of Sea Island cotton, strenuous and skilful action will be necessary on the part of all concerned.

It must be a source of gratification to those who have the interest of the island at heart to realize that in cotton cultivation a valuable subsidiary industry has been placed within the reach of the planting community, and its further development as a rotation crop on lands now under canes, or as a main crop on land not capable of yielding remunerative crops of canes, cannot fail to add to the material wealth of the colony.

SUGAR INDUSTRY.

Sugar Industry in Trinidad.

The *Annual Report* on Trinidad for 1904-5 has the following reference to the sugar industry:—

In spite of the fact that the last decade has witnessed a struggle for existence on the part of the cultivation of sugar, one of our staple products, the revenue of the colony has advanced from £698,939 in 1900 to £811,614 in 1904-5, a steady natural increase being shown each year. The removal of bounties upon the production of beet sugar in Europe, combined with the good prices obtained last year, has given renewed hope to sugar planters and has led to increased activity in cultivation. Moreover, it is realized by the planter that, to ensure success, an improvement in the methods of cultivation is necessary, and that it is truer economy to produce a larger crop to the acre than the same crop from a larger area cultivated. Much attention has, in the past, been paid to the manufacture of sugar, and Trinidad factories are, for the most part, equipped with modern

machinery, but new principles have recently been applied, notably that of diffusion, under what is known as the Naudet system, and it is believed that this has met with some success. With improved cultivation and the employment of more perfect processes of extraction, there seems no reason to doubt that sugar will continue to hold its own in future.

Queensland.

The following is extracted from the *West India Committee Circular* for December 22, 1905 :—

The Melbourne correspondent of the *Financier* gives some interesting particulars regarding the sugar industry of the Australian Commonwealth. The Federal Government propose to raise the excise duty on Australian grown sugar produced by black labour from £3 to £4 per ton, while increasing the bounty on sugar grown by white labour from £2 to £3 per ton. According to the estimates of production and importation given in Sir John Forrest's late budget, the revenue under the proposed change will work out thus for the financial year 1905-6 :—

	Tons.	Duty.
Imported sugar	17,500	£ 93,000
Australian sugar	171,500	686,000
Gross revenue		£779,000
Deduct £3 per ton bounty ...		218,515
Net revenue		£560,485

On the old scale of excise and bounty, the result on an equal estimate of tonnage would be :—

	Duty.
Imported sugar	£ 93,000
Australian sugar	514,500
	£607,500
Deduct £2 per ton bounty ...	146,000
Net revenue	£461,500

According to the above figures, the revenue will be increased by nearly £100,000. Should the reduction of protective duty from £3 to £2—the difference between the excise and import duty—cause increased importation, the amount of benefit to revenue will be proportionately greater. Growers who employ black labour will, however, pay £1 per ton more excise, while growers using white labour pay £1 per ton more in excise, and receive £1 per ton more in bounty. Yet black labour produces more than ever without bounties. Up to the present it is not black-grown, but imported sugar which has been beaten out of the market, at a very large cost to revenue.

The *Mackay Mercury* also gives the following agricultural details in connexion with the above industry. The area under sugar amounted to 120,317 acres, or an increase of 10 per cent. on the previous year, the total area harvested being 82,741 acres, or an increase of 30 per cent. The latter yielded 147,688 tons of raw sugar as against 91,828 tons in 1903, being the highest but one on record. The less proportion harvested in 1903 was small on account of the drought conditions, a large amount of cane having been sold as feed for stock during that year. Last year 16·04 tons of cane per acre were yielded, as against 13·65 in the previous year, and an average of 14·38 tons. The sugar per acre was 1·78 tons as compared with 1·52 tons in 1903, and an average of 1·57 tons. The price paid for raw sugars last year was £12 10s. 11d. per ton, as against £11 3s. 3d. in

1903. This included a bonus of apparently £2 10s. 8d. and £1 14s. 3d., the price actually paid by the refiners being £10 0s. 3d. and £9 9s., respectively.

British Guiana.

The *Demerara Argosy* of December 30, 1905, in reviewing the agricultural operations of the colony during 1904, has the following on the sugar industry:—

The land under cane cultivation during 1905, exclusive of land cultivated by cane farmers, extended to 74,121 acres as against 73,782 acres in 1904.

There are nearly 2,000 acres under canes cultivated by farmers.

As the year closes there are forty-four estates on which sugar is manufactured, and they may be grouped as under:—

Over 6,000 acres	1
" 3,000 "	4
" 2,000 "	5
" 1,000 "	26
Under 1,000 "	8
	44

During the year, plantation Peter's Hall was purchased by the Demerara Co., Ltd., and amalgamated with plantation Diamond. Plantation Success, Leguan, was cropped and abandoned. The produce from canes grown on plantation Bath, Berbice, will, in future, be manufactured on plantation Blairmont, so that during 1906, only forty-two factories will be at work.

SEEDLING CANES.

The area under cultivation in varieties of canes other than Bourbon, now extends to about 18,000 acres, and, as opportunity offers, further extension is being undertaken. During recent years no new seedling of special promise has been grown. The area under cultivation of the following seedlings has been considerably extended, viz, D. 625, D. 109, and D. 145. The D. 625 does not mill well and the megass obtained from it is of poor quality for fuel purposes, but the yield of canes per acre is heavy, and the juice is of fair quality. This cane is the most promising of all the seedlings. D. 109 mills well, and the megass is of fair value as fuel, although not equal to that obtained from the Bourbon cane. The quality of cane juice is fair, but the canes are inclined to be dry. It ratoons well, but cannot be grown to advantage longer than second ratoons, and does not thrive in heavy soils. Owing to the dryness of the cane, the yield obtained from ratoons is often disappointing. D. 145 possesses some good qualities but it does not mill well or supply megass of high fuel value. It does not ratoon as regularly as D. 625 and D. 109. Other seedlings which are being extended, and which do well if planted in suitable soils, are B. 208, B. 147, and B. 109. The B. 208 has, generally speaking, not succeeded well, and it evidently requires special soil and climatic conditions. B. 147 is not as good a cane as the Bourbon and its value lies in its disease-resisting qualities. B. 109 is a promising cane, but like the majority of the seedlings it does best in selected soils. Other seedlings which are being cautiously extended may be named as follows: Sealy Seedling, D. 116, D. 3,956, D. 1,087, and D. 2,468. The cultivation of the White Transparent variety has been more or less abandoned. On a large number of estates the cultivation of the Bourbon cane must be given up owing to the ravages of various diseases of a fungoid character, and only by the substitution of suitable disease-resisting varieties of seedlings, can the abandonment of cane cultivation on these estates be prevented.



WEST INDIAN FRUIT.

PACKING AND TRANSPORT OF ORANGES.

The following note is extracted from the *West India Committee Circular*, of January 5:—

The oranges which enter mostly into competition with the West Indian are the Spanish, which begin to arrive in large quantities in the month of September. The consumption of these is enormous, during the last three or four weeks amounting to as much as 100,000 cases per week. Mr. Thomas Nash, the fruit broker, of Plymouth, has issued a circular letter on the subject of the inferior packing of West Indian oranges, in which he states: 'They (the Spanish oranges) are beautifully graded and packed in attractive papers with various designs printed in colours, gold and silver, according to the design of the packer. These cases are well made and clean. I find that when these arrive the West Indian oranges are cast aside by the buyers, and do not find a ready sale, but have to be worked and pushed on our customers. This need not be. The West Indian oranges, even in the face of the large Spanish imports, would sell readily if the packers would take a leaf from the experience of the Californian orange growers. If these oranges were carefully graded, packed in papers printed with an attractive design, and in nice clean boxes turned out by machinery with a coloured design on them, they would take much better.' Mr. Nash also draws attention to the high sea freight—averaging from 2s. to 2s. 3d. per box—which should be reduced. As to the carrying, he states that a large percentage arrive here with the appearance of being 'cooked,' which he attributed to steam in the hold. Oranges should not be packed in the same hold with bananas, and he considers the superiority in colour of those coming from Jamaica by the specially fitted-up boats of the Elder, Dempster line, to those from Trinidad, is thus explained. May not, however, the differences in climate have something to do with this, due to the more equatorial conditions of Trinidad?

JAMAICA ORANGES.

A leading article in the *Jamaica Daily Telegraph*, for January 10, 1906, deals with the necessity for grading and packing oranges under proper supervision for export trade with the northern markets. The following are some of the chief points brought forward for consideration:—

Jamaica oranges are reported to be fetching low prices in London and New York at the present time, although they are at their best, and compare in quality very favourably with Jaffa and California fruit which are being bought at good prices.

The reason for this state of affairs is not as is supposed, that the keeping and carrying qualities of Jamaica fruit are not so good during the winter months as they are in summer, but rather in the absence of all restrictions on the export of fruit. Very inferior oranges are in consequence exported from Jamaica in August and September, with the result that all oranges from this island are looked upon with suspicion by the buyers. This need not be so. Reference is made to the manner in which the excellence of Canadian apples is maintained by the following sentence, which is quoted from an article in a recent issue of the *London Daily Telegraph*: 'Canadian growers start with the advantage of a government supervision at the place of export, which is jealously careful of the Dominion's good repute in foreign markets; and the knowledge of this acts in a most excellent way in enforcing the best grading and packing at the orchards.'

The *Jamaica Daily Telegraph* believes that such a system as this, in which all oranges intended for export are subjected to careful inspection by a government official, would build up, in foreign markets, a desirable reputation for Jamaica oranges. This would induce growers to be more careful in selecting, grading, and packing. It would probably result in a reputation among buyers that, while placing Jamaica oranges on a par with the oranges from other countries, would materially assist in establishing a remunerative trade in this excellent fruit.

The Durability of Bamboo. The *Agricultural Record* of Trinidad, for December 1891, contained an article dealing with the durability of bamboo, and referred especially to the popular notion that bamboo cut at a 'good moon' was very durable, while the same quality of bamboo cut at a 'bad moon' had no lasting qualities. The author of the article, Mr. J. H. Hart, F.L.S., states that, by merely soaking freshly cut bamboos in water for a fortnight, their durability may be greatly increased; and that bamboos cut in a 'bad moon,' may thus be rendered more durable than those cut in a 'good moon,' which have not been soaked. The author further explains that the bamboo suffers much from the attacks of insects, among which is the small weevil (*Dinoderus minutus*). The effect of the soaking is stated to be the extracting of sugar or other matter which attracts the insects; and, as a consequence, they attack the wood less vigorously.

It would be interesting to know whether further experiments have been carried out since this article appeared, in order to prove the efficiency of this process with regard to other woods and timbers.

EDUCATIONAL.

Agricultural Scholarships.

The Agricultural Scholarships for the Windward and Leeward Islands, of the annual value of £75, offered by the Imperial Department of Agriculture, and tenable at Harrison College, Barbados, have been awarded as follows :—

The *Windward Islands Scholarship* to C. A. O. Phillips, Grenada.

The *Leeward Islands Scholarship* to Norman Leacock Yearwood, Antigua.

Both scholars are expected to arrive by the next mail steamers, and to take up their studies at Harrison College during the present term.

St. Vincent Agricultural School.

The following is the report of the examiner (Mr. F. A. Stockdale, B.A.), on the recent half-yearly examination, of the Agricultural School in St. Vincent :—

Two boys took the paper set for the senior class and both sent in satisfactory answers. Wright is decidedly good throughout, and has again improved, obtaining over 78 per cent. of the total marks. His essay on the cultivation of Sea Island cotton is indeed a credit. Not only is the English good, but it clearly shows that all the points in the cultivation of this crop are clearly understood. The method of picking and sorting is exhaustively treated, and a good knowledge of the pests and their treatment is shown. The other senior—Harry—owing to weak papers in agriculture and dictation, has obtained only about 62 per cent. of the total marks.

Of the twenty-two juniors, only six have obtained over 50 per cent. of the total marks. Eight of these have been admitted since the last examination, but do not seem to have made much progress with the science subjects.

McConnie, who has been in the school only about a year, is at the head of the juniors with 70 per cent. of the total marks. If it be thought that he has had sufficient grounding in the elementary parts of the subjects which he presented for examination, he might be promoted to the senior class. Of the juniors that sat for the examination last June, T. Liverpool, Issac, and Melville occupy the lowest positions. Melville is particularly weak throughout, having obtained only 28 per cent. of the total marks.

Of the more important papers, the arithmetic is the best, the answers of several pupils being worked out very clearly and neatly with accurate results. The agriculture and botany are fair, but the chemistry and geography are particularly weak. In chemistry, not a single boy obtained over half marks; the question dealing with Bordeaux mixture was attempted only by three boys, who clearly showed that they knew very little of this fungicide. As the syllabus included only a very small amount of this subject, it would have been expected that more would be known about those parts that have been treated. I should strongly recommend that during the next half-year, much more attention be paid to this subject, and that the preparation of the more important fungicides and insecticides should be performed. They should be used practically in the gardens, and their actions explained.

More attention should be paid to geography, as the boys have but little idea of the relative positions of the

various islands in the West Indies. Perhaps, a few short essays on the different islands, and the drawing of a few maps, would benefit the pupils, because they would afterwards be in a better position to draw comparisons between the islands.

LOCKED-STILL EXPERIMENT IN JAMAICA.

The following is a report by Mr. H. H. Cousins, M.A., F.C.S., Government Agricultural and Analytical Chemist, Jamaica, on the results of the installation of a locked still at Denbigh estate :—

I am now able to report that the locked still at Denbigh has been efficiently installed, that it is a complete success as a mechanical advantage for handling rum, and that it is now agreed by practical men who have inspected it that the 'Colder' attachment to prevent robbery of high wines from the retorts is an efficient safeguard, and the installation may now be regarded as complete.

The completed installation has cost the board £378 11s. 1d. It should be noted, however, that the spirit safe itself cost only £27, and the main bulk of the expenditure has been spent on structural alterations of decided benefit to the estate. The objection that the sugar industry fund has been squandered on a revenue matter is therefore quite groundless, and I submit that the considerable benefit to the estate is a legitimate charge falling on the £1,000 especially allocated for 'alterations and new plant for estates' distilleries' on the sugar estimates.

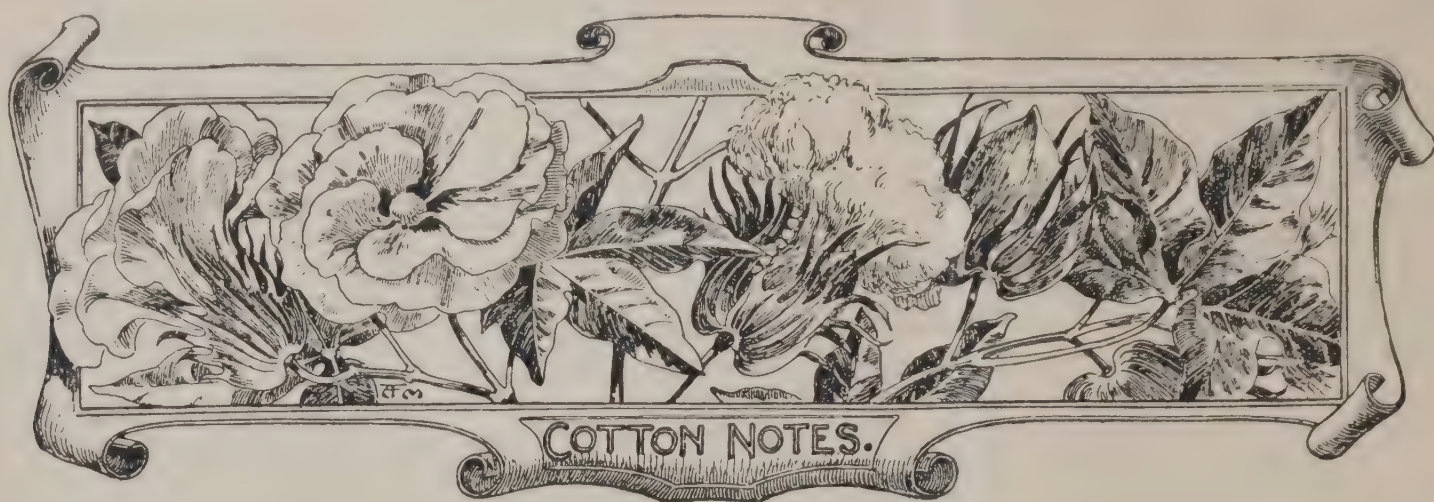
Whereas, before, the rum used to issue from the worm end quite hot, the new 'Colder' cooling arrangement secured a distillate that was never over 81° to 82° F. The can-pit man, who carried the spirit, has been rendered unnecessary; and the distiller is no longer tied down to the can-pit to see that the rum is not stolen. The distiller can now leave the safe for one or two hours and attend to other business while the distillate is flowing automatically into a locked receiver.

I am informed that the records of the local police court show that, in past years, Denbigh was a bad centre for rum stealing, and that the police used to capture twelve to fourteen cases each season which were traced to this estate. During the past crop season not a single case of rum stealing has been reported by the police from Denbigh. I would suggest that the Resident Magistrate and the police be consulted to confirm this statement.

Mr. Muirhead informed me that all the rum stealers had left his estate and were reaping an easy and plentiful harvest in the distillery of 'Parnassus,' the next estate. In previous years, quite a large proportion of the time of the head book-keeper was occupied in attending court and assisting in prosecutions for rum stealing. The advantages to the estate are apparently as follows :—

- (1) saving of one man's wages during crop ;
- (2) relieving the distiller from constant attendance at the worm end while the still is running and enabling him to do other work in the intervals of his control of the spirit safe ;
- (3) reduction of previous loss from imperfect cooling of rum ;
- (4) prevention of all pilfering and removal of a constant source of anxiety and demoralization in the distillery.

I submit that this has been a valuable experiment both to the planters and to the Government, and that we now have a concrete basis upon which the general bearings of the policy of locked stills can be considered so as fairly to equate the interests of the revenue and of the planters.



COTTON INDUSTRY IN ST. VINCENT.

The following is an extract from a letter from the Agricultural Superintendent at St. Vincent, to the Imperial Commissioner of Agriculture, dated January 20, 1906 :—

The first large shipment of 140 to 145 bales will go forward by the Direct Line S.S. 'Sarstoon,' which is due to leave here on Wednesday, January 24. . . This shipment, I think, will be the best, so far, sent from here; I mean as to quality, as all the lint is first class.

To date, 47,141 lb. of lint have been ginned at the central cotton factory. The percentage weight of lint to weight of seed-cotton on four estates was, respectively, 26·7 per cent., 25·8 per cent., 25 per cent., and 27·1 per cent. These percentages, with the exception of the last, are all somewhat lower than last year. I have gone into the question with the manager of the cotton factory, and it is thought that, in most cases, the seed-cotton has been too tightly packed in the bags received, and not sunned and opened enough on the estates. As a result, some of the unopened seed-cotton passes through the seed-grids of the gins and is lost, thereby lowering the percentage of lint obtained. The growers' attention has been called to these points and they have been recommended not to pack more than 100 lb. of seed-cotton in the bags (sugar bags, etc.) sent to the factory. Of course, even by attending to these points the percentage of lint to seed-cotton may not equal last year's results, but should be better than those given above.

The machinery at the factory is running well, and on two days, January 16 and 17, 3,632 lb. and 3,628 lb. of lint, respectively, were ginned.

SELECTION OF COTTON SEED IN THE WEST INDIES.

In an editorial note in the *Agricultural News* (Vol. IV, p. 385), a brief outline was given of a scheme of cotton seed selection to be adopted in the West Indies. In the following memorandum by Mr. Thomas Thornton, A.R.C.S., Travelling Inspector in connexion with Cotton Investigations in the West Indies, particulars as to the method of examining the cotton from individual plants are described :—

The scheme proposed to be adopted in working out the results of the individual plants which have been selected on the different estates is as follows :—

(1) Determination of length of staple, minimum 45 mm. or $1\frac{3}{4}$ inches; (2) determination of percentage of lint to seed, minimum 27 per cent. (3) determination of proportion of weak fibre, maximum 30 per cent.; (4) determination of diameter of fibres; (5) total yield of lint; (6) number of bolls

to plant; (7) silkiness, best St. Vincent (1905) used as grade 1; (8) fineness, best St. Vincent (1905) used as grade 1; (9) size of seeds, determined by number in 50 grams.

In working out the above scheme, all samples which do not come up to the minimum standard of length will be discarded and not submitted to any further examination.

Samples which fulfil the required standard in length will then be further examined, and those producing less than 27 per cent. lint will be discarded. All samples fulfilling the requirements of length and percentage of lint to seed will be examined for the proportion of weak fibre, and all samples will be discarded which produce more than 30 per cent.

The plants fulfilling all the above conditions will then be submitted to an examination with reference to all the other factors.

This scheme will simplify matters considerably as much time will be saved by discarding at once those plants producing lint too short, the proportion of lint to seed too low, and the proportion of weak fibre too high.

The results can then be tabulated, and the reason why any plant has been discarded will be seen at a glance, as well as the qualities which recommend the others for consideration.

SEA ISLAND COTTON IN THE WEST INDIES.

In reference to the note in the *Agricultural News* (Vol. IV, p. 392) regarding a report published in the *U.S. Monthly Consular Reports*, for September last, on the above subject, the following letter from the Secretary, Department of Commerce and Labour, Washington, to the Imperial Commissioner of Agriculture for the West Indies, is published for general information :—

I have the honour to acknowledge your letter of December 12, in which attention is directed to a statement made in *Consular and Trade Reports*. I very much regret that anything published in connexion with efforts that are being made in your section to grow cotton should be regarded as injurious. The introductory paragraph to Consul Clare's report is based not entirely upon that report, but upon reports from various sources, mostly British, which set forth the results of the very laudable efforts that are being made in different sections of the world to grow cotton. There was certainly no intention to misrepresent or injure the enterprise in the West Indies, and I am thankful to you for calling attention to it and for furnishing an extract from the annual report of the British Cotton-growing Association for the year ending August 31, 1905, of which good use will be made.

PROSPECTS OF THE WEST INDIAN COTTON INDUSTRY.

The following letter from the Imperial Commissioner of Agriculture for the West Indies appeared in the *Manchester Guardian* of December 28 last:—

My attention has been called to an article which originally appeared in the *Manchester Guardian*, and has since been quoted in several newspapers in the West Indies, in which, on the authority of the United States Consul at Barbados, it has been stated that 'the efforts to grow Sea Island cotton in the West Indies are not as promising as the cotton world had been led to believe by those who thought that the cotton that was indigenous to the West Indies would surely thrive in those parts.'

I am in a position to assure you that there is no foundation whatever for the view thus taken of the prospects of cotton growing in this part of the world. For the nine months ended September 30 last, we have exported 1,024,283 lb. of Sea Island cotton, of the estimated value of £42,545. It is probable that by the end of this year these islands will export cotton to the actual value of £60,000, and considering the industry was only started three years ago, it must be considered very satisfactory progress. During the coming year it is probable that the exports will be 50 per cent. higher, and nothing has as yet appeared likely to retard the development of the cotton industry, or to prevent its being thoroughly established in these colonies.

In support of what is herein stated I would refer you to the first annual report of the British Cotton-growing Association for the year ended August 31 last, which can leave no doubt as to the very promising condition of the cotton industry in this part of the world.

PICKING COTTON FROM DRIED UP PLANTS.

The fact that one cannot be too careful with the cultivation of cotton is constantly being emphasized. From the preparation of the land to the shipping of the cotton there is no room for half measures, and if the crop is to be a profitable one, thoroughness in every particular must be the watchword of the planter.

When there is any doubt about the advisability of any mode of procedure, the planter should seek advice from an officer of the Department of Agriculture, when all the help possible will be placed at his disposal.

There is one important matter which it is desirable to bring to the notice of cotton planters, viz., the picking of cotton from bolls which have opened after the plants have been cut down. When the plants have been pulled up, or have been pruned with the idea of obtaining a second picking from the new shoots which arise at the base of the old stems, the old plants and plant tops are generally placed in a heap in a corner of the field or the yard, and any immature bolls which happen to remain on the plants will, probably, after a time, burst open. The question then presents itself to the planter—'Am I right in picking the cotton from these bolls and shipping it with the rest of the crop?' The answer to such a question is, emphatically, 'No.' Such cotton should not be shipped under any circumstances, unless the planter wishes to destroy his reputation in the market.

It is not difficult to realize the impossibility of such cotton being as good as it would have been if it had ripened while the plant was growing. When attached to the living plant the fibres are made strong by their walls being thickened, material being added to the inside of their walls by means of the living substance which they contain, and

unless this living substance can be supplied with food material, the thickening of the walls will be brought to an end. When the plant has been cut down, to whatever stage of growth the fibres have arrived, there they will remain.

Some of the bolls may have arrived almost at the stage at which they would have opened under normal conditions, and it may be very difficult for an inexperienced man to detect any deficiency in the quality of the cotton obtained from these bolls; but, wherever there is the least doubt, the Sea Island cotton planter must avoid injuring the quality of his cotton.

Where the practice obtains of picking cotton from dried up plants of any kind and mixing it with the general crop, the price obtained for it, as well as the reputation of that particular estate, will seriously suffer.

If the planter, in order to save waste, wishes to pick the cotton from bolls on dried up plants he may do so, and the seed can be used either for manure or for feeding cattle; but he must, on no account, entertain the idea of shipping the lint.

As has already been pointed out, in cotton cultivation one cannot be too careful. Matters such as are indicated above, should be dealt with in a responsible and intelligent manner so that we may have in these colonies planters on whom the spinners can rely for cotton of a high and uniform quality.

TRINIDAD CROWN LANDS.

In the *Trinidad Gazette Extraordinary*, for December 2, 1905, the Land Regulations are published for general information. The following extract is likely to be of interest:—

Petitions to purchase rural land shall be made for parcels of not less than 5 or more than 100 acres of such land.

No petitioner will be permitted to petition for more than one parcel of land at a time, and no second petition from the same petitioner shall be received until at least one-half of the land already granted to the said petitioner has been brought under cultivation, except by express permission of the Intendant and on his being furnished with satisfactory proof that the second parcel is required for the bona fide purpose of bringing it under cultivation at an early date.

Rural land shall be land other than land reserved or land required to be reserved, or town or village lots or lands forfeited to the Crown. Rural lands may be sold after survey on approval by the Sub-Intendant at the cash price of £2 10s. sterling an acre, which sum will include the cost of survey and grant and assurance fund contribution to the Real Property Ordinance.

Such further price as the Governor may direct may be charged as improved value in respect of any land which may be cultivated or otherwise improved.

Swamp land may be sold at an upset price of £2 sterling an acre to cover all fees and contribution as before stated.

Petitions for parcels of land comprising more than 100 acres shall be submitted, in the first instance, through the Sub-Intendant to the Governor, who shall fix the price for the same, such price not to be less than £5 sterling an acre, except in special instances and by permission of the Secretary of State for the Colonies.

Except by express permission of the Governor in specially exceptional case, no petition shall be received for any parcel of rural land unless it bounds, or is immediately, by survey, connected with lands already alienated.

EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming, should be addressed to the Commissioner, Imperial Department of Agriculture, Barbados.

All applications for copies of the 'Agricultural News' should be addressed to the Agents, and not to the Department.

Local Agents: Messrs. Bowen & Sons, Bridgetown, Barbados. *London Agents:* Messrs. Dulau & Co., 37, Soho Square, W., and The West India Committee, 15, Seething Lane, E.C. A complete list of Agents will be found on page 3 of the cover.

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Agricultural News

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NOTES AND COMMENTS.

Contents of Present Issue.

The editorial in this issue contains interesting statements as to the amount and value of Sea Island cotton exported from Barbados. During the year 1905, Barbados produced lint and seed of the estimated value of £22,530.

Other notes of interest to the cotton grower will be found on pp. 38 and 39. A scheme to be adopted in the selection of cotton seed is there outlined.

On pp. 34-5 will be found notes of interest on the sugar industry, among which are given brief reviews of the industry in Trinidad, Queensland, and British Guiana.

The report of the examiner on the recent half-yearly examination of the Agricultural School in St. Vincent will be found on p. 37.

The insect notes in this number deal with the occurrence of scale insects on old cotton, and the infestation of young cotton from this source. A useful fungus which attacks scale insects is also noted.

An interesting article on the rubber industry is to be found on p. 46. This deals with the growth of the rubber industry, present prices, and the possibility of the use of the seeds for the production of oil and seed-cake.

A note on the Canadian exhibitions, to be held during 1906, will be found on p. 46.

A further note on shade-grown tobacco in St. Kitt's appears on p. 43.

Mocha Coffee.

An article on Mocha coffee, elsewhere in these columns, gives information regarding the way in which this coffee is produced, and the reasons why the output has not increased like that of other varieties in recent years. It is interesting to note that there are no extensive cultivations of Mocha coffee, but that each of the Arabs, who are the growers of this variety, has a few coffee plants growing about his house and produces enough for his own use, and a little for trading for other commodities.

West Indian Fruit.

The articles in this number on West Indian fruits (see p. 36), deal with the necessity for great care in handling oranges for export.

These articles should be read carefully by every one interested in building up a successful fruit industry in the West Indies. Excellent oranges are being grown in the West Indies, but until these are graded and packed according to the best standards, and reach the market in as attractive a condition as oranges from other localities, they will not be well received, and will be unable to establish a desirable reputation.

Remarkable Plant Productions.

The *Agricultural Gazette* of New South Wales, for November 2, 1905, contains an interesting account of an interview with Mr. Luther Burbank, at Santa Rosa, California, from which the following is extracted.

Mr. Burbank is famous for his remarkable productions in the plant world. One of the most wonderful of these is the spineless cactus, which he states 'was produced by crossing a small spineless cactus from Central America with the Arizona cactus and other hardy northern varieties of opuntiae. It is not only valuable as a pasture plant, but the fruit will be valuable as a fruit, and will have a delicious flavour. Even the leaves can be fried and eaten—not boiled, but fried in butter.' Mr. Burbank considers that it will pay to cultivate his new cactus as other crops are cultivated. The food value is equal to alfalfa (lucerne).

It will grow in moist soil, or in situations where there is very little rainfall, and produces heavy crops.

Mr. Burbank has accomplished many other remarkable results in addition to the spineless cactus. Among these may be mentioned the Plumcot, a cross between the plum and the apricot; the Pomato, a cross between the potato and the tomato; the Primus berry, a cross between the raspberry and the blackberry. In addition to the work already accomplished, Mr. Burbank has now over 2,000 different experiments going.

The Carnegie Institute of Pittsburg, Pennsylvania, has granted Mr. Burbank an endowment of £20,000, to be paid at the rate of £2,000 a year, for ten years, to enable him to conduct his costly experiments free from any financial worry.

Rubber and Cotton.

A correspondent writes: 'The cultivation of India rubber trees in Ceylon has been carried on with considerable energy during the last ten years. The exports for 1904 were 681 cwt., of the value (at 5s. per lb.) of £19,068. It is interesting to note that the cotton industry, started less than four years ago at Barbados, is now of the estimated value of £20,230. If we also take into account the value of the cotton industry in the other islands, also started within the last four years, this is estimated at not less than £50,000. It is evident from these figures that when an industry well suited to the West Indian Colonies is placed within their reach, they are as capable, as any British possession in any part of the world, in turning such an industry to the best account.

Spread of Fungoid Diseases.

An interesting series of articles by Mr. G. Masee, F.L.S., on the spread of plant diseases, caused by fungi, is commenced in the *Gardeners' Chronicle* for December 23, 1905. This clearly shows that combined attempts should be made to stamp out these diseases.

The first article deals with the spreading of disease, and is conveniently discussed under two distinct headings:—

- (1) Diseases which appear in new localities through the introduction of new plants.
- (2) Diseases that spread from an area known to be infected to adjoining areas hitherto free from disease.

The spreading of disease, by the spores of fungi adhering to the seed, is discussed at length. From the interesting experiments that have been carried out in the Jodrell laboratory at Kew, it appears that this is a serious danger, and deserves particular attention.

A second method of dispersion of disease, is where the mycelium of a parasitic fungus hibernates in those portions of plants, such as tubers and cuttings, used for reproduction in place of seed. This subject of the spreading of fungoid diseases is of considerable importance to West Indian planters, and it is highly necessary for them to continue the disinfection of cotton seed and the treatment of cuttings of sugar-cane as recommended by the Imperial Department of Agriculture (*Agricultural News*, Vol. IV, p. 101), especially when any interchange is being made between the different islands.

Laws and proclamations dealing with the fumigation of plants for the prevention of the introduction of insect pests have already been issued by many West India Islands. Copies of the laws that were issued at Jamaica, British Guiana, and Dominica were published by the Imperial Commissioner of Agriculture in order to furnish detailed information for the other islands.

It is hoped that in the near future the different governments will prohibit the importation of seeds and cuttings that are likely to be infected, or allow their importation only after disinfection at the point of entry.

Proposed Experiments with Tea in India.

A small pamphlet has recently been issued on the 'Objects and Plan of the Heeleaka Experimental Station,' by Harold H. Mann, D.Sc., Scientific Officer to the Indian Tea Association, and C. M. Hutchinson, Assistant Scientific Officer.

The outline here given of the work proposed to be done at this station indicates that planters should keep themselves informed as to the progress made, inasmuch as the results would have a most important bearing on the tea cultivation of the future. The experiments are to be carried out in respect of three principal points, viz., quantity of yield, quality of product, and capacity of land for future crops. They are to be determined by manurial experiments with both artificial and green manures, pruning and plucking experiments, and the careful study of such problems as drainage, water in the soil, etc.

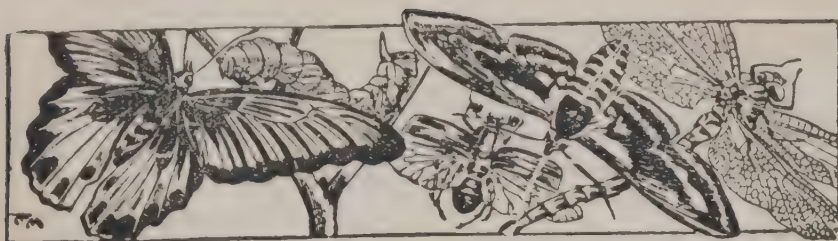
West Indian Bulletin.

The last number of Volume VI of the *West Indian Bulletin* has just been issued. This contains a collection of articles dealing with the sugar industry and should be of considerable interest to planters in these colonies. The first is an interesting article by Mr. H. H. Cousins, M.A., F.C.S., on the sugar industry in Jamaica. The writer clearly explains how the yield of sugar per acre on estates at present in cultivation in Jamaica can be doubled by the most ordinary methods and appliances. He touches on the improvement of canes in sugar content, the cultivation, and defective crushing of canes in Jamaica, and gives a short summary of the work done at, and in connexion with, the sugar experiment station.

The second article is an account of the sugar-cane experiments carried on in Barbados, under the direction of the Imperial Department of Agriculture, for the season 1903-5, which was presented by Mr. J. R. Bovell, F.L.S., F.C.S., at a special meeting of the Barbados Agricultural Society. The experiments consisted of two series: (1) experiments with seedlings and other canes, and (2) manurial experiments. A brief summary of that portion dealing with the experiments with varieties has already appeared in the *Agricultural News* (Vol. IV, pp. 355, 372, and 386).

Another interesting article on the 'Fermentation of Cane Juice' is contributed by the Hon. Francis Watts, C.M.G., D.Sc., and Mr. H. A. Tempany, B.Sc. This shows that cane juice on standing for a few hours undergoes a series of changes. It first becomes sour and develops a considerable quantity of acids. After standing for a longer time, alcoholic fermentation sets in, and, finally, the juice becomes quite sour, forming the so-called cane vinegar.

The last article is by Mr. F. A. Stockdale, B.A., on the improvement of sugar-cane by selection and hybridization, and embodies the results that have been obtained in the West Indies during the last few years with the raising of improved varieties of seedling canes by direct cross-fertilization.



INSECT NOTES.

Scale Insects attacked by Fungi.

The Curator of the Botanic Station at Dominica recently forwarded to the Imperial Commissioner of Agriculture some scale-infested twigs of lime trees from an estate in that island.

From the correspondence accompanying the specimens it appears that a greyish fungoid growth on the lime plants is supposed to have caused the death of a number of the plants.

Examination of the specimens shows that the fungus referred to occurs only in connexion with the orange mussel scale (*Mytilaspis citricola*), and is probably parasitic on the scale insects, and not on the lime trees. The cause of the death of the plants, then, would not be the fungus, but the scale insects, or some other cause which has been overlooked.

In the *Agricultural News* (Vol. II, p. 232) reference is made to two kinds of fungi found in Dominica on scale insects. One of these is probably the same as the one under discussion, although it has not been identified. The other is reddish in colour and has been identified as *Sphaerostilbe coccophila*.

The estate on which these plants were growing is situated at an altitude of about 1,000 feet, in a district where the rainfall is about 200 inches per annum. The land has been recently cleared and there is a large amount of decaying vegetable matter on the surface or in the soil. The lime plants are young, and it is likely that these conditions and the scale insects present are together responsible for the death of a few trees, while the fungus is present as an enemy to the scales and not injurious to the plants.

The Protection of Wood against White Ants.

The following note appears in the *Gardeners' Chronicle* for January 6:—

All timbers in tropical districts, with the exception of a few of the more expensive kinds, are subject to the depredations of white ants, whilst, so far, no treatment for the protection of wood against these pests has been commercially successful. Creosote and other mineral oils have been tried, but they are not lasting. They only partially impregnate the wood, and cannot be used for indoor work. Various chemicals have also been employed, but in general these are inefficient, or too costly. The method introduced, however, by the Powell Wood Process Syndicate, to which we alluded some time since, appears to overcome these objections. This process consists in first boiling the wood in a saccharine solution which expels the air. In the subsequent cooling, the solution is absorbed by the tissues, with the result that the wood is strengthened and improved in quality. It is afterwards artificially dried, and the ordinary process is then complete, the wood being thoroughly seasoned. In order to render wood proof against the attacks of white ants, it is only necessary to combine with the saccharine solution certain substances obnoxious to these insects, which substances are absorbed by the wood along with the saccharine solution. The extra expense is thus confined to the bare

cost of the materials added, which is very small. Samples treated in this manner were sent out to India by the above syndicate, whose offices are in Temple Bar House, E.C., and satisfactory reports regarding the same have recently been received. The application of this treatment will now permit of the more extended use of wood in tropical countries for all purposes, and may lead, in many cases, to the substitution of ordinary timber for more expensive hardwoods.

Scale Insects on Cotton.

The subject of ratooning cotton has been discussed at some length in the publications of the Imperial Department of Agriculture, and reasons have been given why the practice is undesirable. This was especially dealt with from an entomological point of view in an article in the *Agricultural News* (Vol. IV, p. 262). The following instance is an example of the bad effect of keeping old and scale-infested plants up to and after the time of planting for the new crop.

On one estate in Barbados a field of cotton was kept over from the previous season until after planting had been done for the new crop (July 1905). Directly to leeward and adjoining this field, several acres of cotton were planted, while almost adjoining this and across the wind from it another new cotton field was established. The old cotton was allowed to remain until the young plants had been growing some time, even though it was known to be badly infested with the white scale (*Chionaspis minor*), and the black scale (*Lecanium nigrum*).

Recently, these two cotton fields have become very seriously infested with the black scale. In one of them it has been necessary to pull up and burn all the plants, in the other the yield of cotton will be very small. It may be stated that the red maggot occurred in both these fields, but, at the time the plants were being pulled up and burned, the scale insects were doing the greater damage.

The injury to these cotton fields from scale insects may be attributed, almost entirely, to the presence of the old and infested cotton near the young plants.

DISPOSAL OF CACAO HUSKS.

On several occasions attention has been drawn in the *Agricultural News* to the desirability of burying cacao husks. This method of treatment is particularly referred to in the last volume (pp. 203 and 239), where it is advocated as necessary to prevent the spread of pod-rot and other diseases. It is very important that this practice should become general all over the West Indies.

In a recent report to the Imperial Commissioner of Agriculture, Mr. George Branch, Agricultural Instructor in Grenada, mentions that, at all the places visited by him, he is recommending that cacao husks should be buried as soon as possible after the removal of the beans.

A special aspect of this question is brought up by Mr. Branch in the following words:—

Not only is it an important matter from an agricultural point of view, but in districts where the peasant holdings are small and the houses close together the matter becomes a sanitary one. The cacao trees are sometimes growing so close to the houses that the branches actually touch the buildings, and the shells collect water, which, after a while, not only possesses an obnoxious smell but also contains abundant larvae of mosquitos.

BORDEAUX MIXTURE.

The following review of a paper in the *Landwirtschaftliches Jahrbuch* by R. Schandler on recent work relating to Bordeaux mixture is extracted from the *Botanical Gazette*, for December 1905:—

In the large literature on Bordeaux mixture, secondary physiological effects on plants, not due to the fungicidal action of the mixture, have frequently been described. These effects are of two kinds: first, a stimulating effect resulting in darker green, thicker foliage, with increased starch production and decreased transpiration; second, direct toxic action on the foliage and fruits. The whole question, on which many conflicting views have been published, has been critically examined by Schandler. Many writers have attributed the stimulating action of Bordeaux mixture to the entrance of small quantities of copper into the plant, both through the cuticle and the stomata. Schandler finds that leaves injected with a solution of copper sulphate, 1 part in 10,000,000, and allowed to lie in the solution twenty-four hours, showed poisonous effects, while much more concentrated solutions were unable to penetrate the uninjured epidermis when applied externally. The argument is that the cuticle prevents the penetration of very dilute solutions of copper, such as might result from solution of the particles of copper compounds applied to the leaf, but if any copper enters the cells, the results are injurious, never stimulating. By growing plants in water cultures with dilute solutions of copper, it was found that the young roots were gradually killed, whereupon another crop of roots was formed, which also was finally killed, etc. Here again, there was no stimulating action, although the top of the plant remained uninjured, showing that the copper was accumulated by the root cells, even from very dilute solutions, but was not passed on into the vascular system. In soils, a more concentrated solution of copper was required to produce toxic effects on account of their absorption. By appropriate experiments, it is also shown that neither the lime compounds nor the traces of iron produce stimulating effects.

The true explanation of the phenomena is found in the physical action of the coating itself. The same results were produced by shading plants with glass to which a spray of Bordeaux mixture had been applied, also by the use of thin paper or dust. Good results were obtained only in bright, sunny weather, while injury resulted during cold, rainy seasons. This, no doubt, explains the conflicting reports of various investigators. The toxic effect of the mixture is found to be due to solution of the copper, caused by the secretions of glandular hairs, as in the peach, phaseolus, and sunflower.

Rubber planting in Jamaica. His Excellency the Governor, at a meeting of the Jamaica Agricultural Society a short time ago, introduced the subject of rubber, and commended it to the attention of planters. Members present declared themselves willing to undertake the cultivation, and the Director of Public Gardens and Plantations was instructed to procure seed. About 6,500 Para rubber plants (out of 10,000 seeds of Para from Singapore), and 4,500 Castilleja plants have now been raised. They have all been bespoken, but applications will be booked by the Director, and a further supply of seed, both of Para and Castilleja, will be obtained next year. Applications should be sent in at once, as the demand for seed is very great, and soon there will be none available, even at a year's notice. (*Bulletin of the Department of Agriculture*, December 1905.)

SHADE-GROWN TOBACCO AT ST. KITT'S.

The following extract is taken from a letter from the Agricultural Superintendent at St. Kitt's to the Imperial Commissioner of Agriculture on the subject of an experiment with shade-grown tobacco in that island. This is in continuation of the note that appeared in the last number of the *Agricultural News* (Vol. V, p. 26):—

I forward by this mail a few photographs of the tobacco grown at La Guerite under shade of cheese cloth, which well illustrate the height of the tobacco, and the size of the leaves.

The tent was erected over $\frac{1}{8}$ acre of land at La Guerite in the beginning of October, and the plants were put out on October 18. In two months, the untopped plants were 7 feet tall and the topped plants 5 feet. The reaping of the tobacco was commenced on December 23. Half of it is being cured on the stalk, and half is being primed. The experiment, so far, has been satisfactory, and every effort is being made to ensure success in the curing and fermentation.

GALLS ON TREES.

Interesting specimens of a gall on the bread and cheese tree (*Pithecolobium Unguis-cati*, Benth.) were exhibited by Mr. John Hutson, M.B., at the last meeting of the Barbados Natural History Society. Other specimens of galls have been forwarded to the Head Office of the Imperial Department of Agriculture by Mr. R. D. Anstead, B.A., Agricultural Superintendent at Grenada. These occur on cacao and sometimes assume peculiar shapes.

Our knowledge of the primary cause of gall formation is very small. It would appear that only embryonic or very young cellular tissue reacts, and the galls found on leaves and branches are generally of old standing. Galls are either caused by parasitic fungi or by insects.

Those caused by fungi generally appear as abnormal enlargements on the plants attacked. The fungi live on the contents of the host cell, but give it time to react to the stimulus exerted by the intruder.

Those caused by insects start with the laying of the egg in the embryonic tissue of the leaf and stem. The resulting larva begins to feed on the cells, and therefore irritates the surrounding tissue. Rapid growth and cell division follow in the plant. This is of great advantage to the young larva as more food material is brought up for use.

Concerning the development of this excessive localized growth considerable controversy has arisen. Formerly it was thought that the growth was due to some poisonous irritating fluid injected by the parent insect at the time of the laying of the egg. Recent research has shown that this is not the case, for attempts to produce galls artificially by injections of various poisons, etc., have failed, and therefore the stimulus for the tissue formation is now taken to be similar to that exerted in the healing of an ordinary wound. If this be so, how then can the enlargements produced by fungi be accounted for?

Many of the galls have definite shapes, which depend on mutual reactions between the species of plant on the one hand, and the species of gall insect on the other. A typical gall shows three distinct layers of tissue, surrounding the chamber in which the larva of the insect lies: (1) an outer layer of thin-walled cells, covered by the epidermis; (2) a layer of thick-walled cells, which forms a protective layer to the insect, and (3) an inner layer of thin-walled cells, filled with food material on which the insect lives.



GLEANINGS.

According to the *Demerara Argosy* of December 30, 1905, 'the area under rice cultivation extends to about 20,000 acres.'

In the *Annual Report* on Somaliland, for 1904-5, it is stated that cattle are fattened on date stones, ground into meal, and milch animals fed on such a diet are said to produce better and more copious milk.

Copra and cacao continue to be the principal products of Samoa. The copra crop in 1903 was somewhat less than in the preceding year, the natives producing about 4,430 tons. (*Diplomatic and Consular Report* on the German Colonies, 1903-4)

In the report on the Cameroons for 1903-4, it is stated that palm kernels, palm oil, India rubber, cacao, and ivory remained the principal items, and the only notable advance occurred in the production of kola nuts, the exportation of which increased ten-fold. (*Diplomatic and Consular Report* on the German Colonies, 1903-4.)

The *Annual Report* on Uganda for 1904-5 states that 'the trade in Sansevieria and Raphea fibres is growing. Exports totalled £1,711, showing an increase of £893 on the preceding year. The industry is a new one and is capable of large development. The local value of these fibres is about 1s. 4d. for 15 lb.'

During the fortnight ended December 28, 18 bales of West Indian cotton were imported into the United Kingdom. Medium fine is quoted in Liverpool 6¾d. per lb.; West Indian Sea Island, medium fine, 13d. per lb.; fine 14d. per lb.; and extra fine, 15½d. per lb. (*West India Committee Circular*.)

According to the statements in the *Annual Report* of British Guiana for 1904-5, the amount of sugar exported during the year was 106,716 tons as against 125,949 tons for the previous year. The total area of canes at the end of March, exclusive of land cultivated by cane farmers, was 70,880 acres, as compared with 13,837 acres at the close of the previous year. Two estates went out of cultivation during the year.

Trinidad fruit, according to the *Port-of-Spain Gazette*, has been well received in the United Kingdom, arriving sound and in good order. An individual, resident in the north of Ireland, reported that the oranges he received were in fine condition, and that a fruiterer of his acquaintance declared that he had never seen better fruit. These reports are undoubtedly encouraging to shippers, and must give a decided impetus to the fruit industry of the colony.

At the first general meeting of the St. Kitt's Agricultural and Commercial Society, held on January 4 last, his Honour F. S. Wigley, I.S.O., in the Chair, the Hon. Sir Daniel Morris, K.C.M.G., and the Hon. Francis Watts, C.M.G., were unanimously elected honorary members of the society.

In the *Gardeners' Chronicle*, for December 16, 1905, it is stated that the post of Assistant Director at the Royal Botanic Gardens, Kew, is to be revived. It is also expected that considerable developments will be made in the Departments of Forestry and Agriculture, and, it is hoped, in the study of plant diseases.

In the *Annual Report* on Fiji for 1904 it is stated that 'at present the three principal exports—sugar, copra, and green fruit (chiefly bananas)—represent over 97 per cent. of the total export trade of the colony. It is hoped that the Agricultural Department, recently established, will tend to foster minor products, such as cacao, vanilla, rubber, etc.'

In the *Annual Report* on Uganda for 1904-5, referring to the cotton industry, it is stated that 'a commencement has been made with an export of £236. The present year will show a large increase, and before long it is hoped that this product will be one of the principal articles of export from the Protectorate. Locally it fetches about 1s. 4d. for 6 lb.'

Messrs. Elder & Fyffes, Ltd., state that during 1905, 4,722,796 bunches of bananas were imported into the United Kingdom, which is an increase of 1,749,688 bunches as compared with the previous year. Three million, two hundred and sixty-three thousand, nine hundred and thirty-four bunches were received from Jamaica and Costa Rica, and 1,458,862 bunches from the Canary Islands. (*West India Committee Circular*.)

Messrs. Holger Petersen, F. Lassen Landorph, and Captain H. U. Ramsing, members of the Danish West India Estates Directorate, recently called on the Imperial Commissioner of Agriculture. These gentlemen, who are interested in the prospects of Sea Island cotton, had come from St. Croix where certain estates are partially cultivated with this variety. In Barbados they have visited estates where cotton is being grown on a large scale, and have also inspected the central cotton factory.

Messrs. Samuel Pontual and Santos Dias, who have been specially commissioned by the Brazilian Government to visit the West Indies with the object of studying the sugar industry, recently visited Barbados. In an interview, the Imperial Commissioner of Agriculture carefully explained to them the experiments carried out in the West Indies in connexion with the sugar industry. Special reference was made to the work of the Department with regard to the development of seedling canes, and the results of manurial experiments.

The *Pharmaceutical Journal* for December 30, 1905, contains a note on useful plants in Togo and Cameroon, from which the following is extracted: 'The kola tree (*Cola acuminata*), the seeds of which possess four cotyledons, is common in Cameroon, and its seeds are universally chewed, the author himself deriving much relief from them. For cultivation, *Cola vera*, which yields seeds with two cotyledons, is to be preferred, as the seeds realize a higher price in Africa, but those of *C. acuminata*, properly dried, form a valuable article of export.'



THE GRENADA HANDBOOK, DIRECTORY AND ALMANAC FOR 1906: By the Hon. E. Drayton, C.M.G.

This interesting handbook is an unofficial contribution of the Colonial Secretary of Grenada, and gives excellent information about that colony. It is always issued with great regularity, and should be appreciated not only by the inhabitants of Grenada, but also by those interested in the West Indies generally.

The information is compiled and arranged in a careful manner. The articles on the geology and agriculture of the island are particularly interesting. In the latter article it is pointed out that the present prosperity of Grenada depends upon the products of the soil. The staple product is cacao, and this receives valuable assistance from coffee, nutmegs, and other spices to form the principal exports of the colony. A brief outline of the cultivation of cacao and nutmegs, and of their preparation for export as practised in the island, is clearly written, and it is interesting to note that a certain quantity of ground provisions have now to be imported, on account of the gradual absorption of the land by cacao and nutmegs.

A short account is also given of the good work that is being done at the Botanic and Experiment Stations, which were established in 1886 on the recommendations of the Hon. Sir Daniel Morris, exactly twenty years.

Another part of the work contains a list of the birds and animals of Grenada, and of some of the valuable fishes that swim in its waters. There is also a list of some of the principal trees and shrubs of the colony, with their scientific and local names, as well as short remarks on their economic importance.



LEEWARD ISLANDS: REPORT ON SUGAR-CANE EXPERIMENTS, 1904-5, Part I. By the Hon. Francis Watts, C.M.G., D.Sc., F.I.C., F.C.S., Government Chemist, and Superintendent of Agriculture. Price 1s.

This part of the report treats of the experiments made with selected varieties of sugar-canes, with the object of ascertaining which of these are likely to prove useful to sugar planters.

Whilst under experiment, the canes are cultivated in the same manner as the ordinary crop of the estate, and, therefore, close comparisons can be drawn between these selected varieties and those ordinarily grown.

In the introduction to the report an important point is placed on record. It is this. Not only among the canes under experimental cultivation is there an almost complete absence of rotten canes, but the same condition prevails in most of the fields throughout the colony. It is also mentioned that cane diseases now cause the sugar planter little anxiety.

The results obtained in Antigua show that the first six canes are: B. 156, Sealy Seedling, B. 306, B. 201, D. 74, and D. 95. It is interesting to note that these canes occupied a similar position last year. The writer states that one of the points a cane must possess before it can be confidently recommended for cultivation in Antigua, is that it must be capable of resisting drought, and that after the experience of the disastrous drought of last year, the canes above-mentioned should receive considerable attention from planters there.

In St. Kitt's, the White Transparent or Caledonian Queen takes the lead in plant canes. Of the newer seedlings B. 208 merits attention, for a yield of 15 tons of muscovado sugar from 4 acres of canes has been reported. (See *Agricultural News*, Vol. IV, p. 194.)

In ratoons, B. 208 heads the list, and, therefore, would occupy a useful position when introduced into the general cultivation of St. Kitt's.

The report ends with the recommendation for planters in St. Kitt's to substitute B. 208 and B. 147 for Caledonian Queen, where the latter shows any tendency to disease.

INOCULATION FOR ANTHRAX.

The following letter in reference to anthrax vaccines has been addressed by the Chief of the Bureau of Animal Industry, U.S. Department of Agriculture, to the Imperial Commissioner of Agriculture. Previous articles on this subject will be found in the *Agricultural News* (Vol. V, pp. 7 and 23):—

Washington, December 27, 1905.

Dear Sir,—I am in receipt of your letter of the 12th. instant, in which you request information concerning the value of Selavo's anti-anthrax serum, and the names of firms who manufacture this or any other anthrax vaccine.

In reply, I beg to inform you that Selavo's serum has not been investigated by this Bureau nor have we any knowledge of its sale in this country. The only anthrax vaccine on the market in the United States is prepared after the method of Pasteur. It has been claimed that the use of such vaccine has reduced the mortality in the affected districts from an average of 10 per cent. with sheep to less than 1 per cent., and from 5 per cent. with cattle to less than one-half of 1 per cent.

The firms having this vaccine for sale are:—

H. Mulford & Co., Philadelphia, Pa.; Pasteur Vaccine Co., Chicago, Ill.; and Parke, Davis & Co., Detroit, Mich.
A. D. MELVIN.

The Staple Agricultural Industry of Fiji is the cultivation of sugar. There are at present six sugar mills in the colony, four of which are owned by the Colonial Refining Company, Ltd., of Sydney. The total area of land under cane cultivation is estimated at 36,543 acres, from which were produced 550,740 tons of cane in 1904. The total area of cultivated land in the colony (exclusive of native cultivation), is estimated at 68,084 acres. There is a Botanic Station at Suva, from which 1,540 Para rubber plants and 500 cacao plants were distributed free of charge during 1904. (*Annual Report on Fiji*, 1904).



THE RUBBER INDUSTRY.

The following information on the rubber industry is extracted from an article in the *Journal of the Society of Arts*, for December 1, 1905:—

The present total production of rubber is about 70,000 tons, of which nearly 30,000 come from Para. The increase in the demand for rubber has been stimulated by the requirements of cycle, carriage, and motor tyre manufacturers, and of the makers of electrical appliances. In the United States, the demand for it is always very great for the purposes of foot-wear. In 1902-3 the value of unmanufactured India rubber and gutta percha imported into the United States was \$26,092,000; in 1904-5 it had risen to \$46,266,000. It is estimated that the world's annual consumption of rubber at the present time exceeds £16,000,000 in value. Although in some places from which rubber is obtained, more especially Africa, the reckless way in which the rubber has been collected has seriously affected the output, the possible supplies would seem to be ample. Rubber is to be found in immense tracts of country, from Mexico to Paraguay, in America; from Cape Blanco across Africa, and down to the latitude of Madagascar, and on that great island; from Assam southward in Asia to Malacca, Borneo, New Guinea, and a northern patch of Australia. Until recently, rubber was obtained solely from plants growing wild, but the cultivation of rubber-producing plants has now been undertaken on a somewhat extensive scale. The cost of opening and maintaining a plantation until productive is considerable.

Taking Ceylon, Mr. Ardan in a report on *Hevea brasiliensis* places the total cost of opening up 500 acres of land and planting with rubber trees, 20 feet by 20 feet apart, at £5,946 17s. 6d. sterling, or at the average of £11, 7s. 10½d. per acre. It might be thought that this considerable outlay would prevent the rubber produced on these plantations from competing with that collected by natives from wild trees. But it has to be remembered that the collection of what may be called wild rubber is expensive, and necessarily tends to become more so as the trees nearest the coast are exhausted. It must be remembered, too, that the rubber prepared from cultivated trees fetches a better price—sometimes from 1s. to 1s. 6d. per lb. higher—than that collected from wild trees, because it is purer. The loss from 'fine Para' is from 10 to 15 per cent. in manufacture, whereas that from the 'biscuit' rubber prepared from cultivated Para rubber trees is generally less than 1 per cent. Whilst it must be a long time before the wild rubber trees cease to be relied upon for rubber, the advantage of this method of collection as compared with plantation growth is much less than may be supposed by those who have not gone into the matter carefully. The cultivation of rubber trees is already a considerable industry in India, Ceylon, and more particularly, the Malay Peninsula.

The Para qualities (fine Para and negroheads) give the standard for the prices of the other kinds, which always range in proportion to the quotation for these best two products. The lowest price for fine Para was in September and October, 1861, when it fell to 1s. 6d. In 1882 it touched 4s. 11d. In 1902 it was as low as 3s., but since then it has reached a higher figure than ever, and Para is now quoted at 5s. 2d., thanks to American manipulators,

other descriptions being quoted down to 3s., but cultivated rubber fetching 6s.

About 150 decorticated fresh seeds weigh a pound, which is about 340,000 to the ton. It is estimated that a Para tree produces, on an average, 400 seeds per year, so that about ¼ ton would be produced per acre. The seed kernels contain 50 per cent. of oil of a light yellow colour, somewhat resembling linseed oil. Analysis shows that a cake prepared from Para rubber seed meal would compare favourably with other cakes as a cattle food, and that it contains a particularly low proportion of indigestible matter, that is to say, fibre. Specimens of both the seeds and oil have been submitted to leading brokers. They report that the oil could probably be used as a substitute for linseed oil, and would be worth at present about £20 per ton, but that oil merchants would not take it up unless they first had an opportunity of testing it in bulk. The brokers consider that it would be more profitable to ship the seeds themselves to this country, as is done in the case of most other oil seeds. They value the decorticated seeds at £10 to £12 per ton.

CANADIAN EXHIBITIONS, 1906.

The following is a letter addressed to the Imperial Commissioner of Agriculture by Messrs. Pickford & Black, of Halifax, in reference to exhibitions to be held in Canada during 1906 (see *Agricultural News*, Vol. IV, p. 397):—

We are in receipt of your favour of the 16th. instant, No. 5,647, and carefully note all you say.

We have engaged space at the Toronto and Halifax exhibitions, and, as already advised, we will do all possible to make it attractive, should the different islands decide to send an exhibit. The managements of both exhibitions have expressed their wish to us that an exhibit from the West Indies be obtained, and have also promised us the very best of space to display the exhibit.

The following further letter, received from Messrs. Pickford & Black, is published for general information:—

Referring to our letter of December 27 regarding West India exhibits for the Toronto and Halifax exhibitions, there is no question but that if an exhibit is got together for these two exhibitions, it will be one of the best advertisements the West Indies ever had in Canada, and you can rest assured we will do all in our power to make the display a good one.

BELLOWS FOR APPLYING PARIS GREEN.

The following paragraph in reference to a bellows used by the Sea Island cotton planters for applying Paris green is taken from a letter to the Imperial Commissioner of Agriculture, from a correspondent in the Sea Islands of South Carolina, U.S.A.:—

The planters used a new appliance last season for applying Paris green. It is a small hand bellows with long handles and a suitable nozzle. The powder is put in a receptacle, and with a slight convulsive movement of the handles it is blown out in little puffs. The bellows is so simple and efficient that it immediately superseded all previous appliances.

Inquires are being made regarding this bellows, and it is expected that further information will appear in a subsequent number of the *Agricultural News*.

MOCHA COFFEE.

The following information as to the conditions under which Mocha coffee is grown and shipped, is extracted from the *U. S. Monthly Consular Reports*, for October 1905:—

Consul Masterson, of Aden, Arabia, furnishes a report on Mocha coffee which will interest all lovers of the popular beverage and surprise many who imagine that all the coffee they purchase under the label 'Mocha' is the genuine article. Mr. Masterson explains the limitations upon the growth of Mocha, and the care that is taken by the local authorities to prevent other coffees from being substituted and shipped from Aden as Mocha. His report follows:—

I suppose of all the many kinds of coffee grown, the one and only kind that is unable to compete with other coffees is Mocha. No matter how much greater and better the facilities are for handling and putting coffee on the market than in the past, or how much more the growers may know about the best way of raising coffee, the output of Mocha coffee remains the same, or even less, as the years go by, and, until a complete revolution comes about in the way this crop is raised, handled, and marketed, it will remain the same, or grow gradually less.

In favoured countries where coffee plantations are extensive, the labour cheap, and all kinds of mechanical appliances are used for hulling, cleaning, sorting, and packing, the prices are gradually growing less each year. More coffee is coming into the market also by reason of these appliances and facilities, and, as the output increases in other countries, the output of Mocha coffee gradually lessens.

As Mocha coffee is now produced, it is about as cheap in the market as it can well be sold. Any one who is at all familiar with the coffee market knows that the price of Mocha coffee has varied less than any other coffee within the past ten years, and that, even if the price of other coffees has gradually grown less and less, the value of Mocha has not dropped in proportion because, until conditions change, it is now as low as can be.

RAISED BY THE ARABS.

Unlike the raising of coffee in other countries where we can, without much difficulty, know all about each crop, how much it will likely yield, and the condition of each growing crop, the raising of Mocha coffee is done by Arabs out in the mountainous country of Arabia where no white man has ever been, and statisticians and crop forecasters are unknown. There are no extensive plantations there as we know of them in other places, but each Arab has his own few bushes around his little house and raises enough coffee for his own use and a little for trading for other commodities. It thus becomes a difficult and slow process to collect from hundreds of people enough to load a caravan. The markets of Aden and Hodeida are several hundred miles from the place where the coffee is grown, and the journey to these markets takes several weeks.

In passing through the different districts under control of some native sheik or Turkish official, this coffee is always subject to a levy, toll or tariff from each official. Then, when it finally reaches the seaport market, the process of arranging it for shipment is a slow and expensive one. It is always brought in unhulled, or just as it was picked from the plant. It is first hulled by passing it between two millstones turned by hand; then it is winnowed and sorted by Indian women, each grain being carefully looked over

and all the uneven or indifferent grains being taken out. It is then ready for packing and shipping. Anyone can see that coffee raised, handled, and marketed in such a fashion can never compete with coffee raised under more favourable conditions, and it can further be seen that Mocha coffee is bound to be of a higher price, and that prices are also bound to remain stationary as long as such conditions prevail.

PROTECTION AGAINST IMPOSITION.

The export of Mocha coffee from Aden for the last ten years has fluctuated in the output, but it has gradually dwindled, with an occasional recovery in some years; but, as will be seen, the output for the year 1895-6 was considerably greater than for the year 1904-5. The great falling off for the past year is easily explainable, as the bubonic plague was very bad here and many caravans were stopped on this account. This also explains the small export for the year 1900-1, as there was also plague here during that year. There are two other causes that have contributed to the small export for last year, viz., the war between the Arabs and Turks in the Yemen, and a famine has also prevailed there during that time.

France has, with the exception of one year (1898-9), led in the importing of Mocha coffee, with the United States in the second place, followed by the United Kingdom and Germany in the order mentioned. The local government and the Aden Chamber of Commerce have taken the necessary precautions for protecting the coffee merchants in this place in their business, and no outside coffee is allowed to be transhipped from here, nor is any coffee allowed to be shipped from this port as Mocha, unless it is the genuine article. If there is any adulterating, blending, or mixing, it is done after it leaves this port.

WEST INDIAN TRADE WITH CANADA.

The *Maritime Merchant*, of December 14, 1905, has the following note on the trade between Canada and the West Indies during the year 1905:—

Speaking of the carrying trade this season between Canada and the West Indies, the *Merchant* was told that it had shown a satisfactory increase. All steamers this fall have had full outward cargoes. The shipments of flour, oats, and feed have exceeded those of last year. Split peas is an article of which considerable quantities have been forwarded by way of Halifax this season, instead of going via New York, as in former years. There has been a falling off in Canadian exports of butter and cheese to the West Indies this year, the country not having so great a surplus, owing to the heavy drought and the shortage of feed last winter. A good trade is being opened up in condensed milk, also in furniture, canned goods, boots, and shoes. The sale of Canadian soaps is decidedly on the increase, as is also that of biscuits. For the latter there is a large field and more business could be done if it were pushed.

Imports have been large, nearly all the West Indian crystal sugar having been taken by Canada. Canada has also increased her purchases of oranges and bananas, the direct facilities having helped this trade. The Canadian consumption of cacao is yearly increasing.

The low price of sugar at present is not very encouraging, the immediate outlook being poor for all except the largest estates and those equipped with the best machinery. However, the estates got good prices up to midsummer and had a good deal of money to spend.

MARKET REPORTS.

London,—January 5, 1906. Messrs. KEARTON, PIPER & Co.; Messrs. E. A. DE PASS & Co.; 'THE WEST INDIA COMMITTEE CIRCULAR,' December 22, 1905; 'THE LIVERPOOL COTTON ASSOCIATION WEEKLY CIRCULAR,' December 28, 1905; and 'THE PUBLIC LEDGER,' December 30, 1905.

ALOES—Barbados, 15/- to 60/-; Curaçoa, 17/- to 75/- per cwt.
ARROWROOT—St. Vincent, 2d. per lb.

BALATA—Sheet, 1/4 to 1/11; block, 1/4 to 1/4½ per lb.

BEES'-WAX—£7 17s. 6d. per cwt.

CACAO—Trinidad, 52/- to 60/- per cwt.; Grenada, 46/- to 52/- per cwt.

CARDAMOMS—Mysore, 7½d. to 3/- per lb.

COFFEE—Jamaica, good ordinary, 38/- to 40/- per cwt.

COTTON—West Indian, medium fine, 6·85d.; West Indian Sea Island, medium fine, 13d.; fine, 14d.; extra fine, 15½d. per lb.

FRUIT—

BANANAS—Jamaica, 1/6 to 6/- per bunch.

GRAPE FRUIT—6/- to 7/- per box.

LIMES—4/- to 4/6 per box.

ORANGES—Jamaica, 6/- to 8/- per box of 176-200.

FUSTIC—£3 5s. to £4 per ton.

GINGER—Jamaica, 42/- to 53/- per cwt.

HONEY—20/- to 25/- per cwt.

ISINGLASS—West Indian lump, 2/1 to 2/6; cake, 1/- to 1/4 per lb.

KOLA NUTS—4d. to 6d. per lb.

LIME JUICE—Raw, 9d. to 1/- per gallon; concentrated, £16 per cask of 108 gallons; hand-pressed, 2/3 to 2/6 per lb. Distilled Oil, 1/4½ to 1/5 per lb.

LOGWOOD—£4 to £4 15s.; roots, £3 10s. to £4 per ton.

MACE—Fine pale, 2/4; fair to good pale, 1/4 to 1/6; red, 1/- to 1/3 per lb.

NITRATE OF SODA—Agricultural, £11 2s. 6d. per ton.

NUTMEGS—70's, 10d.; 83's, 9d.; 90's, 7½d.; 101's, 116's, 6d.; 5½d.; 125's, 4½d. per lb.

PIMENTO—Fair, 2½d. to 2½d. per lb.

RUM—Demerara, 1/1 to 1/2½ per proof gallon; Jamaica, 2/1 per proof gallon.

SUGAR—Yellow crystals, 14/- to 17/3 per cwt.; Muscovado, 15/- to 15/6 per cwt.; Molasses, 11/- 16/- to per cwt.

SULPHATE OF AMMONIA—£12 7s. 6d. to £12 8s. 9d. per ton.

Montreal,—December 12, 1905.—Mr. J. RUSSELL MURRAY. (In bond quotations, c. & f.)

COCOA-NUTS—Jamaica, \$27·00 to \$29·00; Trinidad, \$24·00 to \$25·00 per M.

COFFEE—Jamaica, medium, 10c. to 11c. per lb.

GINGER—Jamaica, unbleached, 7½c. to 10c. per lb.

MOLASCUIT—Demerara, \$1·00 per 100 lb.

MOLASSES—Barbados, 30c.; Antigua, 26c. per Imperial gallon.

NUTMEGS—Grenada, 110's, 18c. per lb.

ORANGES—Jamaica, \$2·65 per barrel, duty paid.

PIMENTO—Jamaica, 5½c. per lb.

SUGAR—Grey crystals, 96°, \$2·12 to \$2·20 per 100 lb.

—Muscovados, 89°, \$1·60 to \$1·75 per 100 lb.

—Molasses, 89°, \$1·35 to \$1·50 per 100 lb.

—Barbados, 89°, \$1·45 to \$1·70 per 100 lb.

New York,—December 22, 1905.—Messrs. GILLESPIE BROS. & Co.

CACAO—Caracas, 12c. to 12½c.; Grenada, 10½c. to 11c.; Trinidad, 11½c. to 11¾c.; Jamaica 9¾c. to 10½c. per lb.

COCOA-NUTS—Jamaica, \$23·00 to \$25·00; and Trinidad, \$22·00 to \$25·00 per M.

COFFEE—Jamaica ordinary, 8½c. to 10½c. per lb.

GINGER—Jamaica, 7c. to 9½c. per lb.

GOAT SKINS—Barbados, Dominica, and Jamaica, 58½c.; St. Kitt's, 51c. per lb.

GRAPE FRUIT—Jamaica, \$4·00 to \$6·00 per barrel; \$3·00 to \$3·50 per box.

HONEY—Jamaica—No quotations.

LIMES—No quotations.

MACE—27c. to 31c. per lb.

NUTMEGS—West Indian, 70's to 80's, 20c.; 105's to 110's, 13c.; 115's to 130's, 10c. per lb.

ORANGES—Jamaica, \$4·00 to \$4·25 per barrel; \$2·00 to \$2·50 per box.

PIMENTO—4½c. per lb.

PINE-APPLES—No quotations.

SUGAR—Centrifugals, 96°, 3½c.; Muscovados, 89°, 3½c. Molasses, 89°, 2½c. per lb.

INTER-COLONIAL MARKETS.

Barbados,—January 13, 1906.—Messrs. T. S. GARRAWAY & Co., and Messrs. JAMES A. LYNCH & Co., January 20, 1906.

ARROWROOT—St. Vincent, \$3·80 to \$4·25 per 100 lb.

CACAO—\$9·00 per 100 lb.

COCOA-NUTS—\$10·00 per M. for husked nuts.

COFFEE—\$10·50 to \$11·75 per 100 lb.

HAY—\$1·60 per 100 lb.

MANURES—Nitrate of soda, \$65·00; Ohlendorff's dissolved guano, \$55·00; Cotton manure, \$48·00; Sulphate of ammonia, \$75·00; Sulphate of potash, \$67·00 per ton.

ONIONS—Madeira, \$2·75 per 100 lb.

POTATOS, ENGLISH—Nova Scotia, \$2·25 to \$2·75 per 160 lb.

RICE—Ballam, \$4·20 to \$4·35 per bag (190 lb.); Patna, \$3·15 to \$3·25; Rangoon, \$2·65 to \$2·75 per 100 lb.

British Guiana,—January 17, 1906.—Messrs. WIETING & RICHTER.

ARROWROOT—St. Vincent, \$8·00 per barrel.

BALATA—Venezuela block, 25c.; Demerara sheet, 38c. per lb.

CACAO—Native, 12½c. to 13c. per lb.

CASSAVA STARCH—\$4·00 to \$4·50 per barrel.

COCOA-NUTS—\$10·00 to \$12·00 per M.

COFFEE—13½c. to 13¾c. per lb.

DHAL—\$4·65 to \$4·70 per bag of 168 lb.

EDDOES—\$1·44 per barrel.

ONIONS—Lisbon, 3c. per lb. (ex store).

PLANTAINS—16c. to 32c. per bunch.

POTATOS, ENGLISH—\$2·60 to \$3·00 per barrel.

POTATOS, SWEET—Barbados, 96c. per bag.

RICE—Ballam, \$4·35 per 177 lb.; Creole, \$4·10 per bag (ex store).

SPLIT PEAS—\$5·80 per bag (210 lb.).

TANNIAS—\$2·16 per barrel.

YAMS—White, \$1·92; Buck, \$2·40 per bag.

SUGAR—Dark crystals, \$1·90 to \$2·00; Yellow, \$2·40 to \$2·50; White, \$3·25 to \$3·50; Molasses, \$1·75 to \$2·00 per 100 lb. (retail).

TIMBER—Greenheart, 32c. to 55c. per cubic foot.

WALLABA SHINGLES—\$3·00, \$3·75, and \$5·25 per M.

Trinidad,—January 19, 1906.—Messrs. GORDON, GRANT & Co.; and Messrs. EDGAR TRIPP & Co.

CACAO—Ordinary to good red, \$11·00 to \$11·25; estates, \$11·40 to \$11·75 per fanega (110 lb.); Venezuelan, \$11·50 to \$12·00 per fanega.

COCOA-NUTS—\$20·00 per M., f o b.

COCOA-NUT OIL—72c. per Imperial gallon (casks included).

COPRA—\$2·90 to \$3·00 per 100 lb.

DHAL—\$3·90 to \$4·00 per 2-bushel bag.

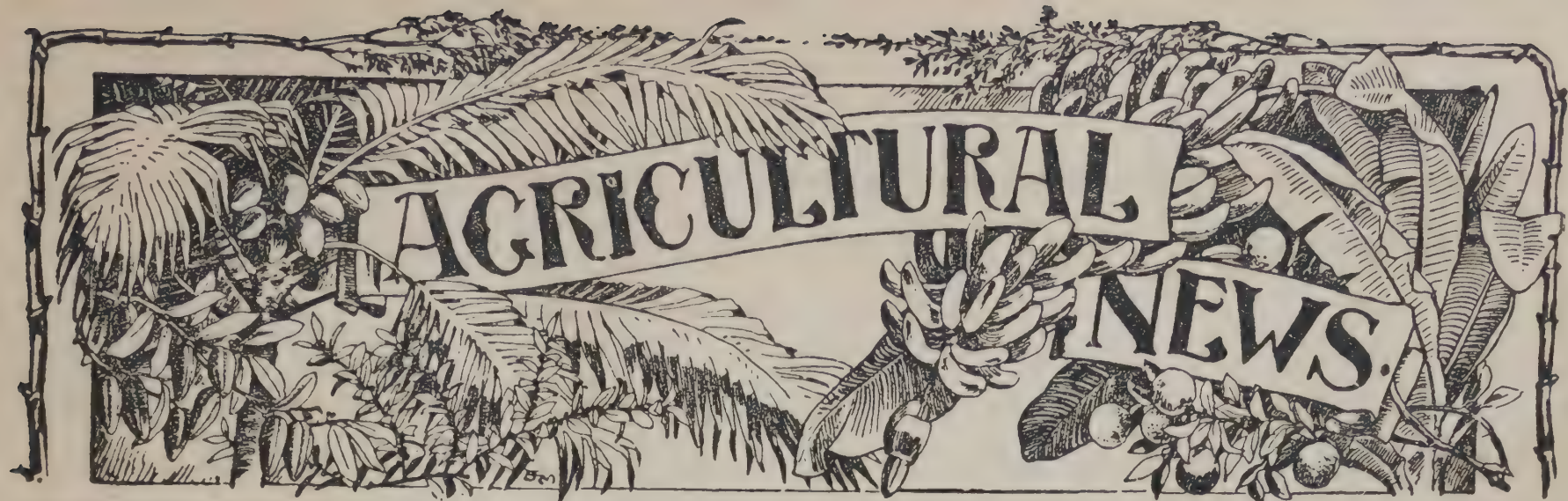
ONIONS—\$1·60 to \$1·70 per 100 lb. (retail).

POTATOS, ENGLISH—\$1·25 to \$1·40 per 100 lb.

RICE—Yellow, \$4·40 to \$4·60; White, \$4·50 to \$5·60 per bag.

SPLIT PEAS—\$5·00 to \$5·25 per bag.

SUGAR—No quotations.



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Antigua Central Sugar Factory.

IN presenting to the readers of the *Agricultural News* the first Annual Report of the Directors of the Antigua Central Sugar Factory, reference is made to the article which appeared in the *West Indian Bulletin* (Vol. VI, pp. 60-4). This article gives an account of the efforts which finally resulted in the formation of a factory company, a brief explanation of the agreement between

the company and the estate proprietors of the plan for the distribution of profits, and of the machinery and the capacity of the factory.

The figures given show that the estimated cost was £40,000, and the actual cost, as indicated by the expenditure at the end of the year 1905, was £42,408.

The factory was finished in 1905, and the first year's working was completed at the end of the sugar crop of that year.

It will be seen from the report that follows, that the severe drought seriously affected the amount of canes supplied to the factory, and the profits are thereby considerably reduced.

In forwarding a copy of this report to the Imperial Commissioner of Agriculture, Dr. Francis Watts, C.M.G., writes as follows :—

‘It should, however, be pointed out that the first year's working of a new concern such as this, situated in a country where skilled labour is difficult to obtain, and where all concerned are more or less unfamiliar with work of the kind undertaken, there would be many defects due to inexperience, minor accidents, and the newness of the plant. In the returns now put forward no correction or adjustment has been made on this account; the working, including all defects, has been fully stated. During the coming season, it is hoped and expected that there will be considerable improvement; but still, taking matters as they stand, it is felt that the working has been satisfactory and encouraging to those who contemplate undertaking similar work.

‘It is very unfortunate that the drought resulted in so small a crop, for the factory appears to be quite capable of dealing with from 3,000 to 4,000 tons of sugar in three to four months.’



RUBBER TAPPING IN CEYLON.

Several references to the work done on the important Kepitigalla estate, in the Matale district of Ceylon, have already appeared in the *Agricultural News*. In Vol. II, p. 265, information was given as to the collection and preparation of rubber, while in a more recent issue (Vol. V, p. 5), the method of collecting seed on the same estate was described.

As a typical example of a well-worked plantation of cacao and *Hevea brasiliensis*, a brief account of rubber tapping on Kepitigalla estate is given in the *India Rubber World* for January 1, 1906. The following is extracted from this article:—

There are now about 1,400 acres in rubber on Kepitigalla, of which 830 acres form the old estate and 570 are new clearings. This all lies along steep hillsides and faces due west. In this there is a peculiar advantage. The whole place being in the shade of the hill until a comparatively late hour of the morning, tapping can be carried on until 10 or 10.30 a.m. Kepitigalla was first and foremost a cacao estate, the rubber being planted with the primary object of giving shade to the cacao, with the thought that if rubber should prove a paying thing, the trees would be there to produce it. The oldest trees were planted along the roads and ravines, and gradually throughout the cacao, so that now, from certain elevated points, one can look over a fine stretch of *Hevea* foliage. The rubber trees tower well over the cacao. The rubber is planted through alternate lines of cacao 24 feet by 12 feet, and along the roads, ravines, etc., 12 feet by 12 feet. [This would give 155 and 330 rubber trees per acre, respectively.—The Editor.]

The land has an elevation of from 600 to 2,000 feet; the soil is of a generally rocky, and in parts, very rocky description, but it is particularly good, and goes down deep so that the rubber trees thrive well. In places they seem to be growing out of sheer rock, and, where the enormous taproot of the tree finds scope to grow is a puzzle. On one road which had to be widened, the soil was dug away from the bank to a height of 5 feet, exposing to this length the great tap and thick surface roots of two *Heveas*, which now stand right out from the corner of the bank. The trees apparently have not been in the least affected by this treatment.

Killing a *Hevea* tree by overtapping has not yet been reported in Ceylon. In the case of wounds a splash of tar keeps out fungus spores, and the bark gradually closes over the gaping wound. No tree is tapped until it is at least of 20 inches girth at 3 feet from the ground, and the older trees are from 50 to 60 inches or more in circumference.

Mr. Holloway has always been in favour of single, short, obtuse V cuts, up and down the stem. According to its girth each tree carries six, eight, or ten cups at a single tapping. The trees are tapped twice during the morning, and there is no evening tapping.

The Holloway tapping knife is an improved V-cutting knife. It is heavier than the old knife * and has movable blades. The V-blade head is fastened to the handle by two small screws and nuts, and a blade, when worn down after four months' use, is easily replaced. The tapper on arriving

at the factory with his latex has to strain it, place it in the coagulating pans, and set these out to coagulate. Each man's latex is kept separate and numbered, so that it can at once be seen if a man is doing his work properly, and if not, he is given a 'half name' for his day's work. The coagulated biscuits are next day passed through a mangle and then sent into the hot air drying room, with a temperature of 100° to 105°. The rubber is practically dry after one day there, and is then passed into the drying and store-room, where it remains until several thousand pounds are ready to be graded according to colour, and packed for transport to Colombo.

ONION CULTIVATION IN THE SOUTH-WEST.

The following note on the sowing of onion seed in beds and later transplanting to the field has been taken from the *Farmers' Bulletin*, No. 233, U.S. Department of Agriculture (*Experiment Station Work*, XXXI):—

Sowing onion seed in beds or cold frames and later transplanting to the field has been found to be more satisfactory in New Mexico, than sowing the seed in the field. However, practically all the onions now grown in New Mexico are from seed sown in the field. When sown in beds and transplanted, from 3 to 4.5 lb. of seed are required, while if the seed is sown directly in the field, 4 to 6 lb. are required. At that station it has been found better to transplant in the latter part of February or early in March, even if the onions are only one-half as large as a lead pencil, than to wait until later in the season. It has been found that a boy can drop the onions for about three planters. A good planter will set 5,000 plants per day. With hand cultivation, it is recommended that the rows be about 15 inches apart, and the onions set 4 to 4.5 inches distant in the row. The average estimated cost at the station for transplanting, for a period of three years, has been about \$30.00 per acre, while the cost of thinning onions grown from seed in the field has been \$41.00 per acre.

From time to time, there have appeared in the *Agricultural News* hints on the cultivation of this vegetable; chief among them being an illustrated article in Vol. II, pp. 294-5, and an editorial on the subject in in Vol. III, p. 289. In addition to these notes, further and fuller information may be obtained from pamphlet No. 16, *Hints on Onion Cultivation*, issued by the Imperial Department of Agriculture.

COTTON AND RICE IN BRITISH GUIANA.

The following extract from the *Demerara Argosy*, of January 20, 1906, gives a brief account of cotton and rice experiments conducted by Mr. Pasea on behalf of the Board of Agriculture on plantation Aurora:—

The four varieties of Egyptian cotton were found to be doing fairly well, while the Sea Island was growing luxuriantly. The plants are very vigorous, and there is every promise of a good crop being reaped. The soil at Aurora is a somewhat light loam, and the mode of growth bears no resemblance to the manner in which cotton grows on the clay soils of the colony.

Mr. Pasea is also experimenting with the varieties of rice, the seeds having been supplied to him from the Botanic Gardens. Much importance is attached by the Board of Agriculture to these experiments, carried out as they are on abandoned cane fields.

* This old knife was figured in the *Agricultural News* (Vol. II, p. 265), fig. 19. [Ed. A.N.]

WEST INDIAN PRODUCTS.

Drugs and Spices in the London Market.

The following report on the London drug and spice market for the month of December 1905, has been received from Mr. J. R. Jackson, A.L.S. :—

Signs of the approach of Christmas and the attendant holidays begin to show themselves at a much earlier date at the present time than they did of old. Almost before November is out, preparations for the festive season are apparent, and even in Mincing Lane its effects begin to be felt by a decreasing trade activity at the beginning of December, further declining as the month advances.

The turmoil of a general election, which is on the eve of taking place at the time of writing, has also had the effect of diverting men's minds from business to politics, so that the results of the December markets have been of a quiet, if not, a dull character.

The principal items of interest in West Indian products are as follows :—

GINGER.

In this article there has been but little business doing in any kind, and especially in Jamaica. At the auction on December 6, only 23 barrels of Jamaica were offered, all of which were bought in at 46s. for middling. About 700 packages of Cochin and Calicut were catalogued, but only 100 were disposed of at steady rates, including bright, plump, washed Cochin at 23s. 6d., and some private deals in fair washed Cochin at 24s. On the 13th., only 1 barrel of Jamaica was offered and disposed of at 31s. for ordinary small. No ginger of any description was offered on either of the two concluding sales on the 20th., and 27th.

NUTMEGS, MACE AND PIMENTO.

Of nutmegs, at the first sale on the 6th., out of some 290 packages of West Indian offered, 258 met with purchasers; the smaller sizes being at a slight advance and the larger at a slight decrease on previous prices. A week later, the sales were unimportant and no alteration took place at the concluding sales. Mace was in small demand, and was sold at ordinary rates throughout the month. Pimento, at the first sale on the 6th., was sold at 2³/₄d. to 2¹/₂d. per lb., and at succeeding auctions no change occurred.

ARROWROOT.

At the beginning of the month it was stated that there was every possibility of this article becoming dearer, that the stock of good manufacturing St. Vincent in London was small, and that the arrivals in any quantity were not expected till February or March. At the sale on the 6th., out of 132 barrels of St. Vincent offered, about one-half was sold at 2⁵/₈d. per lb. In the week following, the price had altered to 2d., and on the 20th., 160 barrels of St. Vincent were offered and bought in at 2¹/₂d. per lb.

SARSAPARILLA.

This article continues to be scarce, and at the drug sale on December 14 it was reported that there were no Lima or Jamaica on the spot, the nominal price for the former being quoted at 1s. 7d., and for the latter 1s. 9d. On the 21st., an arrival of 21 bales of Vera Cruz was announced, the spot price being 5³/₄d. to 6d.; 1s. 10d. being quoted for grey Jamaica, and 1s. to 1s. 3d. for native red.

LIME JUICE, OIL OF LIME, KOLA, AND TAMARINDS.

The only other West Indian products brought forward during the month were: at the first sale, 22 puncheons of low,

brown, raw West Indian lime juice, which sold without reserve at 4d. per gallon; 9d. being asked for fair pale Antigua. For 6 cases of distilled West Indian oil of lime 1s. 4d. per lb. was paid, and for good, 1s. 5d. For kola 3¹/₂d. per lb. was paid for good bright Ceylon, and 3¹/₄d. for Grenada. Tamarinds of good quality were reported scarce. Fine new Barbados in bond realized 18s. per cwt. Three barrels of fair St. Kitt's sold without reserve at 9s. duty paid, while 48 casks of common black East Indian were bought in at 7s.

CHILLIES.

In connexion with the possible future cultivation of chillies in the West Indies, the following note on the African trade in these fruits may be of interest. The exports from Uganda (which are said to be made chiefly from Busoga) are very largely on the increase, their value having risen from £54 in 1903 to £4,383 in 1904. This rapidly increasing business has been the means of inducing the people to take up the cultivation of the plant which grows wild in the country. At a recent auction for bright yellowish Nyasaland, 30s. 6d. per cwt. was paid, and 31s. to 32s. for fine red East Coast African; some red and yellow partly perished Mombasa realizing 24s. 6d., while a few fine red Mombasa capsicums were disposed of at 50s. per cwt.

JAMAICA RUM.

In a previous number of the *Agricultural News* (Vol. III, p. 428), it was noted that the Government of Jamaica had appointed Mr. J. C. Nolan as its special Commissioner to undertake the prosecution of offences under the Merchandise Marks Act, so far as such Act applied to Jamaica rum.

The London *Daily Telegraph*, for January 12, 1906, under the heading 'London Police Courts,' gives an account of a case tried at the Guildhall, in which a prosecution was instituted by Mr. Nolan against a dealer in wines and spirits, for selling a gallon of spirit, not Jamaica rum, to which a false trade description, viz., 'Jamaica Rum,' was applied, contrary to the Merchandise Marks Act, 1887.

The prosecution pointed out that the excellent reputation of Jamaica rum, and the great demand for it, furnished an incentive to supply an inferior spirit which was neither distilled in Jamaica, nor made from the products of the sugar-cane.

It was not suggested that in this case deliberate fraud was intended, but rather that there was gross carelessness on somebody's part.

This was the first prosecution, and it was hoped that the trade would recognize the determination of the Jamaica Government to put a stop to the sale of the spurious spirit, and be careful to supply nothing but pure Jamaica when it was asked for. It was stated that the competition between the 'silent spirit' and Jamaica rum has been so keen in the five years past, that the number of distilleries in Jamaica has decreased from 150 to 108.

The defendant, who carried on an extensive business, gave an undertaking to be more cautious than ever in future.

The Alderman, Sir Joseph Savoury, said it certainly was a most important case, particularly to the colony from which Jamaica rum was exported. It had been urged in mitigation that the defendant carried on a large trade. His view was that large traders were able to do the most mischief, and should take proportionate care. But, as they had heard, this was the first case of the kind, and in the hope that others would take warning by it, he imposed a fine of 5s. and £18 8s. costs.



WEST INDIAN FRUIT.

ST. LUCIA BANANAS.

In a recent letter to the Imperial Commissioner of Agriculture, Mr. J. C. Moore, Curator at St. Lucia, reports as follows on the progress made in two experimental plots of bananas at Union Experiment Station:—

Plot 'A' contains $\frac{1}{2}$ acre, and was planted in April 1905 with suckers from the St. Lucia Botanic Station, at 9 feet by $11\frac{1}{2}$ feet apart.

Plot 'B' contains 1 acre, and was planted in May 1905 with suckers from Barbados, the distance apart being the same as in plot 'A.'

The land occupied by these plots had previously been cropped with Sea Island cotton, and no special cultivation was given. A considerable number of the suckers first planted were killed by a boring insect (? *Tomarus bituberculatus*), and supplies were necessary to replace them. The following notes, made during the early part of January 1906, show the conditions of these plots about eight months from planting:—

		'A.'	'B.'
Number of plants	...	197	416
Plants fruiting	...	127	252
Bunches ripe (or already cut)	...	9	—
Bunches with ten hands	...	12	27
„ „ nine hands	...	53	80
„ „ eight „	...	34	88
„ „ seven hands or less	...	19	16

The bunches of saleable sizes are 87 per cent. of the total.

THE COLONIAL FRUIT SHOW.

The Colonial Fruit Show was opened at the Royal Horticultural Hall, Vincent Square, Westminster, on December 5, 1905.

In its issue of December, *Tropical Life* writes of the West Indian section of the Exhibition as follows:—

Under the auspices of the West India Committee, tropical fruits representing the West Indies made a very effective show, the stalls extending as they did the entire length of the spacious new hall facing the main entrance. The exhibits also included Trinidad cigars shown by Messrs. James Philip & Co., which were awarded a gold medal at the Crystal Palace Exhibition last summer.

The Royal Mail Company, and the West India Fruit Company, had a fine collection of fruit on show, including 'claret bananas' a bunch of which we afterwards saw in a shop window for sale. There is no doubt, these exhibitions have been a great help in introducing West Indian fruits to the public on this side.

The West India Committee's stall included exhibits from the Agricultural and Commercial Society of Grenada, whose economic products were particularly well put up, and from the Royal Agricultural Society of Jamaica; while the smaller exhibits included the Jamaica cigars of the Golofina Tobacco Company, recently awarded the Grand Prix at the Colonial Exhibition; and oranges and grape fruit from Messrs. Aston W. Gardner & Co. A special feature was made of West Indian limes, which it is claimed are infinitely superior for all purposes for which lemons are now used. The delicacy of flavour, aroma, and the juiciness of West Indian limes make them preferred to lemons by those who have tried them.

WIRELESS TELEGRAPHY AT TOBAGO.

The following interesting messages have recently passed between the inhabitants of Tobago and the Governor of Trinidad, by means of wireless telegraphy:—

To his Excellency the Governor.

The inhabitants of Tobago, now for the first time in telegraphic communication (through Trinidad) with the mother country, wish the first message sent to England to convey to His Majesty the King an assurance of their devoted and affectionate loyalty.

The Hon. the Colonial Secretary—to the Warden of Tobago.

I am directed by his Excellency the Governor to forward, for the information of the inhabitants of Tobago, the following message from the Secretary of State for the Colonies: 'I am commanded by His Majesty the King to request you to convey his thanks to the inhabitants of Tobago for their loyal sentiments, and his congratulations on the establishment of "wireless" telegraphic communication with this colony.'

The Warden of Tobago—to the Hon. the Colonial Secretary.

Telegram received. I desire to express, on behalf of the inhabitants of Tobago, their grateful appreciation of His Majesty's most gracious message.

The Demerara *Daily Chronicle*, in its issue of January 16 last, states that for messages not exceeding twelve words, exchanged between these two islands, the charge is 2s., each word over twelve costing 2d., and for official messages, the charge will be at one-half these rates. The scale of charges is high, but, no doubt, as the traffic develops, it will be found practicable to reduce the rates.

EDUCATIONAL.

Agricultural Scholarships.

The following notice, relative to the local Agricultural Scholarships offered at Barbados, is published for general information :—

Notice is hereby given of one or more vacancies among the Agricultural Exhibitions granted by the Imperial Department of Agriculture, tenable at Harrison College, and open for competition by boys who intend to make agriculture their life's work, and whose parents are in receipt of an annual income of not more than £200.

For further information, apply to the Secretary of the Education Board, Barbados.

Dominica Agricultural School.

The following is the half-yearly report of the examiner (Mr. F. A. Stockdale, B.A.) on the examination of the Agricultural School in Dominica:—

Eighteen pupils sat for the examination and all took the papers set for the junior class. The work throughout is very uniform, and of a very satisfactory nature. A. T. Pinard has continued his steady progress, and has come first, having obtained 71 per cent. of the total marks. Cuffy and Augustine also sent in very good papers, and obtained nearly 70 per cent. of the total marks. Considering that these three boys have maintained the high positions they obtained in the last examination, they might proceed with the syllabus for the 'seniors,' but particular care must be taken over their chemistry. Six other boys obtained over 60 per cent. of the total marks, while only four obtained less than 50 per cent. These four were Devin, Bruney, Lawrence, and Peltier. Peltier and Lawrence occupied the same position in the last examination. The most marked improvement shown by any individual is that of G. N. Pinard, who has risen from 16th. to 10th. on the list.

The arithmetic is again the best of the more important papers, several of the pupils obtaining nearly full marks. The botany is also very good. The chemistry papers sent in were decidedly weak, the preparation of Bordeaux mixture being little known. As this is a question of economic importance in agriculture, more attention should be paid to the preparation of this fungicide. There seems to be a tendency amongst all the boys to learn off the notes of lessons by heart. They should be taught to think and reason for themselves. Great care should be taken with the experiments performed, and the class should be asked to make observations for themselves. A little more practice in writing essays on subjects not directly dealt with in their notes would possibly induce a little originality of thought.

DEPARTMENT NEWS.

The Imperial Commissioner of Agriculture left Barbados by the S.S. 'Oruro' on February 6, on a visit to St. Vincent and St. Lucia.

It is probable, if steamer facilities admit, that he will also proceed to Dominica, and return to Barbados in the course of this week.

AGRICULTURAL SHOWS.

Forthcoming Agricultural Shows.

The fixtures for agricultural shows in the West Indies during 1906 are as follows :—

Antigua, February 22 ; Dominica, February 23 and 24 ; St. Vincent, March 7. It is proposed to hold on the first Monday in August a cottagers' show at Harris' Village in Montserrat, under the auspices of the Agricultural Society of that district.

The Virgin Islands' agricultural show was held at Tortola, September 13, 1905. An account of this show has already been given in the *Agricultural News* (Vol. IV, p. 365).

An agricultural show was held in Nevis on January 18 last, an account of which appears on this page.

The cottagers' show at Carriacou was held on January 26, as mentioned in the *Agricultural News* (Vol. V, p. 24). An account of this show will appear later.

Agricultural Show at Nevis.

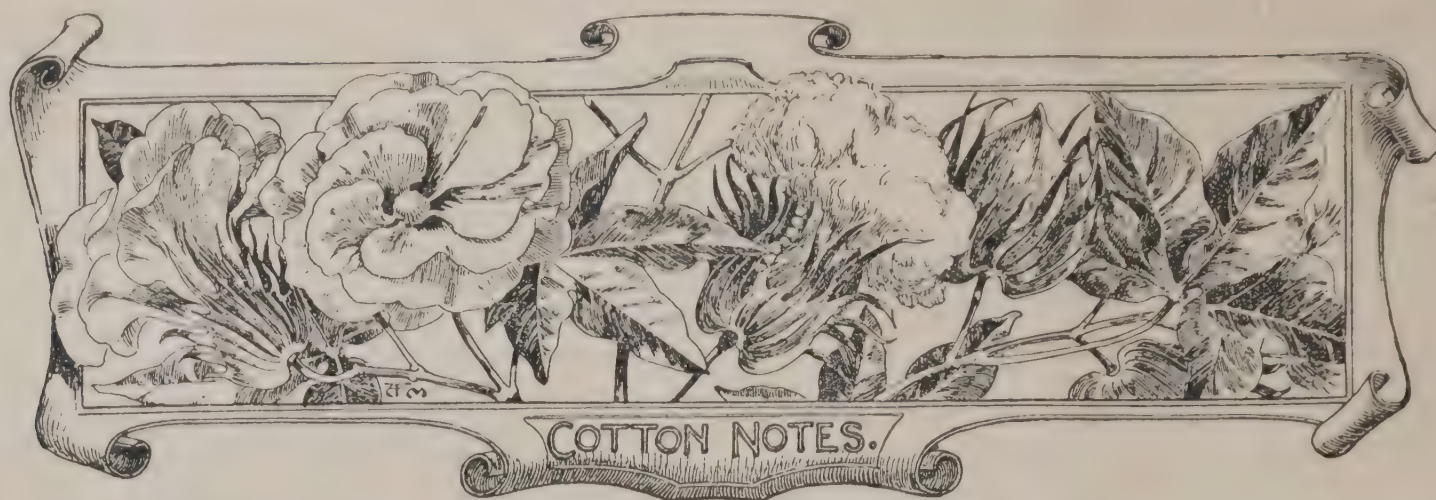
The Hon. C. Arthur Shand, Resident Magistrate, Nevis, in a letter to the Imperial Commissioner of Agriculture, writes as follows :—

The Agricultural Show held on the 18th. instant was a far more successful affair than I anticipated when last writing. Although there was a marked falling off in the number of exhibits, the quality of those shown was far superior in many instances to those of 1905. In the nine classes there were 405 entries. Class I, Live Stock, in which there were sixty-four exhibits, was excellent, and the arrangements this year admitted of greater facilities for examining the animals which were displayed to their utmost advantage. The chief prize for horses was won by a black stallion under three years, entered by a man named Charles Mariner. Sir Robert Bromley who very generously presented £5 for the purpose of special prizes expressed a wish that this money should be awarded to the best cared for animals at the show.

Sir Robert himself decided the awards without any outside assistance, and I need hardly say that his decision gave universal satisfaction. The arrangement of getting in the imperishable exhibits on the day preceding the show worked, on the whole, satisfactorily, and resulted in a much more pleasing distribution of the articles shown. The exhibits in industries were better than last year, as were also the meals, for which latter I arranged with Mr. Hollings to make a special table, divided into compartments, into which tissue paper of various colours was inserted and thus each exhibit presented a uniform appearance. The vegetables were very good, though fewer than last year. The chief falling off was in canes, fruits, plants and preserves ; but the almost entire neglect of the first-named was atoned for by the abnormal prominence given to the new rival 'cotton,' of which you will receive samples through Mr. Hollings by this opportunity. There were actually thirty-six entries in seed-cotton and lint.

The new ginnery recently erected by Mr. Huggins in Charlestown was started on the day of the show, when it was visited by Sir Robert Bromley and Dr. Watts.

There were many more visitors from St. Kitt's than on the last occasion, and they not only expressed approval, but gave practical illustration of it by making sundry purchases of poultry, etc.



GILBERT'S SEA ISLAND COTTON.

The variety of Sea Island cotton known as 'Gilbert's cotton' has been grown at Antigua and in some of the other islands in the West Indies. As the lint produced by plants of this variety appears to possess good qualities and is being tried in several localities, it may be useful to publish the following account of its origin, as given by Dr. Watts in a letter to the Imperial Commissioner of Agriculture dated January 29 last:—

When in England in 1903, I received applications for supplies of cotton seed for Antigua. At my request, the British Cotton-growing Association forwarded 5 bags of Sea Island cotton seed to Messrs. A. J. Comacho & Co., by the Royal Mail steamer sailing on July 22. A portion of this seed came into the hands of Mr. Anderson of English Harbour, who raised from it a crop of lint which fetched a good price, so the seed was saved. In 1904, Gilbert's estate obtained seed from Mr. Anderson, and cotton grown both by Mr. Anderson and by Gilbert's estate from this seed was found to be of excellent quality. Seed from this crop at Gilbert's was saved and distributed to the Botanic Stations in the other islands under the name of 'Gilbert's seed.' A considerable quantity was also sown in Antigua. This season, 1905, the lint from Gilbert's seed appears to retain its good qualities. I have been favourably impressed with the evenness of the staple in some samples which I have examined. In addition to this, it possessed good length of staple, and other good qualities.

COTTON IN BRITISH HONDURAS.

The *Government Gazette* of British Honduras for December 30, 1905, contains a report by the Director of the Imperial Institute on four samples of cotton sent from British Honduras on September 8, 1904. Extracts from the Director's report are as follows:—

The samples have been examined in the Scientific and Technical Department of the Imperial Institute and are described below. A portion of each sample was ginned in the Department by means of a Platt's Macarthy gin, and was submitted to experts for commercial valuation.

Sample No. 1, labelled 'cotton, "King," (Upland class), Corozal station,' was reported to be worth about 6*d.* per lb.; middling' American cotton being quoted at 5·78*d.* per lb. on the same date.

Sample No. 2, labelled 'cotton, "Peterkin," (Upland class), from Corozal station,' resembled No. 1 in appearance but was of shorter staple and worth about 5·75*d.* per lb., with 'middling' American at 5·78*d.* per lb.

Sample No. 3, labelled '“Russell Big Boll,” (Upland class), from Corozal Station,' was reported by commercial experts to resemble sample No. 1, but to be more lustrous and worth 6·10*d.* per lb., with 'middling' American at 5·78*d.* per lb.

Sample No. 4, stated to have been grown from Egyptian seed in the Corozal district, was reported to be much stained and discoloured, and to contain a good deal of perished cotton. It was strong, but would suffer considerable waste in the process of manufacture. The product was valued at 5¼*d.* to 5½*d.* per lb., 'fully good fair brown Egyptian' being quoted at 8½*d.* per lb. on the same date.

The results of this examination show that the American cottons were of very good quality, and would be readily saleable in the English market. The Egyptian cotton, however, was less promising and was decidedly inferior to the average qualities of this product grown in Egypt. It appears, therefore, that if the American cottons could be grown satisfactorily on a large scale, their cultivation might prove remunerative. At present, however, cotton cultivation in British Honduras must be regarded as experimental, and attention should be directed to a consideration of the questions of rainfall and climate, and to well-directed experimental cultivation on a small scale.

SELECTION OF COTTON SEED.

The following is an extract from a circular letter addressed by the Imperial Commissioner of Agriculture to officers of the Department, in reference to the assistance proposed to be offered to planters who desire to use the cotton seed grown on their own estates for planting purposes during the coming season:—

It would appear that many planters are anxious to use the cotton seed grown on their own estates for next general planting.

This matter, as you are aware, is one of very great importance, as the quality of the cotton reaped will depend very much on the seed that is planted.

Only seed which is known to have been produced on plants yielding a high quality of lint should be planted. Up to the present, the number of the estates producing this high quality of lint is comparatively small.

Where desirable, samples of seed-cotton (not less than 8 oz. in weight) might be obtained from those who intend to use their own seed, and forwarded to this office where they could be examined, and a report prepared as to their relative merit.

By such means, it is probable that the Department would afford valuable assistance in the selection of the best seed for planting during the coming season.

GINNING SEA ISLAND COTTON.

The attention of cotton growers has frequently been called to the necessity for great care in harvesting Sea Island cotton, in order that the best quality of lint may be produced. It may be useful at this time to indicate the ways in which the lint is liable to injury in the process of ginning. This should be of especial interest considering the number of ginneries at present in operation under different managements in the West Indies.

Cotton is liable to be damaged in the ginnery in two principal ways: (1) the breaking of the fibres, and (2) the breaking of the seeds.

The broken fibres are shorter than the general length of the staple, and are all combed out when passing through the combing machine in the spinning factory. If these are present to any considerable extent, they are a very prominent source of loss to the spinner.

When the seeds are broken, it is very difficult to separate the pieces from the lint. They pass between the stationary blade and the roller with the lint; and, although a person is always engaged behind the gin to clean the lint as it passes through, it is impossible to take out all the broken seed, when the machines are not in good working condition.

There are many causes which may be responsible for these defects. Broken fibres may be caused by:—

- (a) either of the blades being bent so that they come in contact;
- (b) the blades being set too close together;
- (c) the knife being too hard pressed against the roller;
- (d) the movable knife rising too high;
- (e) anything getting fast between the blade and the roller.

Seeds may be broken by:—

- (a) the blades being set too far apart so that the seeds get between them;
- (b) either of the blades being bent so that the seeds get between them;
- (c) the roller being worn at one or more places, allowing the seeds to get between the roller and the blade;
- (d) the grooves in the roller being too deep, i.e., those which have been made to enable the roller to hold the cotton and draw it beneath the blade. If these grooves are too deep the seeds will get into them and, passing partially beneath the blade, will be broken, and the fragments will pass on with the lint.

All machines should be regularly overhauled, and if any defects are seen they should be at once remedied. Nasmith in *The Student's Cotton Spinning* speaks of broken seed being mainly caused by lack of care in ginning, and the result of a forced production at the ginning factories. To the same cause may be attributed broken fibre and stringy cotton. There is also caused in the ginning process a good deal of 'nep.' It should be remembered, that it is not desirable to overload the gins at any time.

There is no difficulty in detecting the broken seeds in the lint, but it is not such an easy matter to detect the broken fibres. These can be detected only by microscopic examination. To examine a sample of lint in order to see if the fibres are being broken, it should be taken right across the gin and not at any one place; otherwise, at one or more points, considerable damage might be done without being detected.

The sample should be divided into portions, and each of these drawn out and redrawn until all the fibres are parallel. The long fibres can then be removed by drawing out those which reach the ends. It will not be necessary to examine

these, for it is obvious that they cannot be broken. After removing the long fibres, the ends of the short ones should be brought as nearly as possible parallel with one another, and then examined under the microscope. Short fibres are not necessarily broken ones. If unbroken, both ends will be seen intact. The end which was attached to the seed is usually of a darker colour, more or less roughly pointed or rounded, but never jagged, while the other end is a long-pointed one. If the fibres have been broken, jagged ends are seen besides the normal ends just described, which indicate that something is wrong. When these are found, no time should be lost in trying to discover the cause and in putting it right.

SEA ISLAND COTTON MARKET.

The Sea Island Cotton Report of Messrs. Henry W. Frost & Co., of Charleston, South Carolina, dated January 13, 1906, contains the following:—

Islands.—There has been a better demand this week, resulting in sales of upwards of 700 bags, odd bags on a basis of fine, 22c.; and extra fine, 25½c. to 26c. There was also a further demand for fully fine at 23c., which the factors are still holding at 24c. Besides the above, four planters' crop lots, aggregating about 110 bags, have been sold at 32c. to 33c. The buying has been general for England, France, and the North.

The report, dated January 20, 1906, reads as follows:—

Islands.—There was a better demand this week for the odd bags classing fine, fully fine and extra fine, resulting in sales of about 1,000 bags, on a basis of fine, 22c.; fully fine, 23½c. to 24c.; extra fine, 25½c. to 26c.; the buying being for England and the Northern Mills.

The odd bags classing fully fine and extra fine have been largely disposed of, and the stock of them now consists of about 1,000 bags, classing fine and below.

The planters' crop lots which are held higher than the odd bags, have not been in demand, and as there is more anxiety to sell, we can, with orders in hand, buy at some concession.

WEST INDIAN COTTON INDUSTRY.

The following is an extract from a letter of the Hon. Francis Watts, C.M.G., D.Sc., in reference to the cotton industry in the West Indies:—

There is every reason to hope that the cotton industry is now firmly established, and this assurance is continually growing. At the same time, however, it becomes more and more clear that the industry is a highly specialized one, and that the skilled assistance of a Department of Agriculture is essential to its stability, for without this skilled assistance (including the services of an Agricultural Superintendent, and a Mycologist, and Entomologist) it is probable that the high quality of the lint cannot be maintained, nor the numerous pests successfully dealt with.

Sale of Cotton Act, 1906. An Act of great importance to the cotton industry in Barbados has recently been passed by the Legislature. It is entitled the 'Sale of Cotton Act, 1906,' and provides for the triennial appointment of Cotton Inspectors by the Vestries of each parish and for their due payment; for the registration of all lands under cotton cultivation; for the issuing of certificates to sellers and the granting of licences to purchasers; and for the penalties to follow on a breach of its regulations.

EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming, should be addressed to the Commissioner, Imperial Department of Agriculture, Barbados.

All applications for copies of the 'Agricultural News' should be addressed to the Agents, and not to the Department.

Local Agents: Messrs. Bowen & Sons, Bridgetown, Barbados. *London Agents:* Messrs. Dulau & Co., 37, Soho Square, W., and The West India Committee, 15, Seething Lane, E.C. A complete list of Agents will be found on page 3 of the cover.

The *Agricultural News*: Price 1d. per number, post free 1½d. Annual subscription payable to Agents, 2s. 2d. Post free, 3s. 3d.

Agricultural News

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NOTES AND COMMENTS.

Contents of Present Issue.

The editorial in this issue deals with the report of the Antigua central sugar factory.

The West Indian fruit notes include a report on experiments with bananas in St. Lucia, and a brief account of the Colonial Fruit Show.

The cotton notes in this number should be of especial interest to cotton growers. The short account given of the damage likely to be done to cotton in the ginning process ought to be useful, and should help to remedy any defects in this line.

The insect notes on p. 58 give an account of the interesting ground pearls, and also of a peculiar bug from cotton in Nevis.

The Agricultural Show held at Nevis recently, would seem to have been very successful from the report that appears on p. 53. It will be noted that the quality of the exhibits was good, and that a large number of visitors from outside the island were present.

On p. 62 will be found an interesting article on rubber tapping in Ceylon.

On the same page will be found a note on onion cultivation, which indicates that in New Mexico, sowing the seed in beds and transplanting to the field is more profitable than sowing the seed in the field. The transplanting method is the one most commonly in use in the West Indies at the present time.

The Agricultural News.

The attention of the readers of the *Agricultural News* is called to the fact that this issue is No. 100, and may therefore be considered to mark an epoch in the life of this journal.

The first number of the *Agricultural News* was published on April 25, 1902, and in the opening sentence of its editorial, the purpose of its being was stated to be the supplying, in a popular form, of information of an agricultural character suited to the requirements of the West Indies. That the *Agricultural News* has been true to its first purpose, cannot be doubted; that it is popular is amply proved by its ever-increasing circulation.

The Manuring of Cotton.

It is interesting to note that a well manured cotton field in St. Kitt's is giving a very large yield. The number of bolls on the plants is from 180 to 240, with an average of about 200. Wide planting was adopted, the plants being 5 feet by 4 feet apart.

In Barbados, a well manured field is giving very different results. Although the plants are large, there is an average of only forty-one bolls on each. Planting in this instance was very close, being 5 feet by 20 inches, and two plants to the hole. Probably the exclusion of light and air from the lower parts of the plants, due to close planting, has, in this instance, been responsible for the falling off of a large number of bolls.

Notes on West Indian Industries.

An interesting review of the agricultural industries in the West Indies is given by Mr. L. Lewton-Brain, B.A., F.L.S., (formerly Mycologist and Agricultural Lecturer on the staff of the Imperial Department of Agriculture) in the *Hawaiian Forester and Agriculturist* for December 1905.

Starting with the formation of the Imperial Department of Agriculture in 1898, on the recommendation of the Royal Commission of 1897, he traces the work that has been done in aiding the sugar industry by the introduction and raising of new varieties of sugar-cane, in the encouragement of existing subsidiary industries, and in the introduction of others.

Particular attention is drawn to the development of the fruit industry, especially to the growth of the banana industry of Barbados.

An interesting account is given of the growth of the cotton industry. It is traced from the first preliminary experiments, which showed that cotton could be made a paying crop in the West Indies. The visit of the Hon. Sir Daniel Morris, K.C.M.G., and Mr. J. R. Bovell, F.L.S., F.C.S., to the Sea Island cotton region of the United States of America, to make a special study of the methods of cultivation and manufacture in vogue there, is also dealt with. The knowledge thus gained proved of great value to those embarking on a strange culture, and has greatly assisted in placing the cotton industry in the important position it now holds in the West Indies.

Mention is also made of several minor industries such as arrowroot, cocoa-nuts, rice, and tobacco.

Bananine.

The article on Bananine which appears on p. 61 gives some interesting facts in regard to the derivation and uses of this valuable product. Bananine is now made in British factories from British Colonial products and is said to have an extremely high food value, and to be useful for persons of delicate digestion.

Budded and Grafted Plants at Dominica.

The *Official Gazette* of Dominica for January 13, 1906, contains the following notices with regard to the supply of budded and grafted plants:—

‘Owing to the length of time required to bud and grow orange plants for sale, it is necessary that the Botanical Department should know early what number of budded plants are required for the coming season.

‘Planters requiring supplies of budded oranges, lemons, grape fruit, etc., for delivery during the latter half of the present year are requested to send their orders to the Botanical Station not later than February 17.

‘No orders for budded stocks for delivery during 1906 will be received after the date mentioned. Budded plants are sold at 6*d.* each. Grafted mango plants of the following varieties can now be purchased at the Botanical Station at the rate of 2*s.* per plant: Julie, Gordon, Amelia, and Ceylon No. 1.’

Bahamas Sponge Fisheries.

The *Pharmaceutical Journal* for January 27, 1906, contains an article on the Bahamas Sponge Fisheries from which the following statements are taken: There are 265 schooners of from 5 to 43 tons burden, and 322 sloops of from 1 to 16 tons burden, with an aggregate tonnage of 5,952 employed in the sponge fishery business in the year 1904-5. Attached to the vessels were 2,517 open boats, and 5,517 men and boys were employed on them. In addition to these, there were 291 open boats engaged, manned by the owners, to the number of 445, who live on the coasts of several of the out-islands. Much alarm has been felt respecting the future prospects of this industry, which is of so great economic importance to the colony. Disquieting reports as to the exhaustion of the sponge beds, and the increasing quantities of small sponges brought to market, which should have been left in the beds to grow to a proper marketable size, led to the enactment of a law under which a Sponge Fisheries Board is established with certain powers for the regulation of the fisheries, and provided with a small annual grant for expenses. Recently, as appears from the annual report of the Board to the Governor and Legislature, the Bight of Abaco has been examined, and the result fully confirms the suspicions previously entertained. The report states that the beds are thickly sown with small sponges, which are constantly being gathered by the itinerant fishermen who are continually working over these fields, pulling all the sponge they can find without regard to size or quality, in consequence of which there are very few large sponges to be found anywhere.

Vegetable Butters.

The first part of an article on vegetable butters will be found on p. 59 of this issue. This article will be continued in a subsequent number. The different varieties of these substances are discussed and useful information is given as to their nutritive value, and the ways in which they may be used.

Lectures on Commercial India Rubber.

In view of the demand that has arisen for the ‘Cantor Lectures on the Plants yielding Commercial India Rubber,’ delivered by the Hon. Sir Daniel Morris, K.C.M.G., at the Society of Arts in 1898, the Council has decided to have the lectures reprinted for general information. The Secretary states: ‘This is the first time that any sufficient demand has arisen for any course of Cantor lectures to justify their being reprinted. A good many courses of lectures have gone out of print, but there has not been sufficient demand to justify the cost of reprinting them.’

What is Rum?

The attention of readers is directed to a short resumé given on p. 63, of a case in which a London wine and spirit merchant was prosecuted for selling as Jamaica rum, spirit which was proved not to be so.

The *West India Committee Circular* of January 19, in commenting upon this case, fears that the outcome of it will be to fix Jamaica rum as the only recognized standard. Briefly speaking, rum is the tropically fermented and distilled product from sugar-cane juice or molasses after more or less sugar has been extracted. Its basis is alcohol, and it owes its essential qualities to the presence of flavouring ethers, which are produced mainly under the conditions of a tropical climate.

Jamaica rum is celebrated for its quality and its flavour, and thereby commands a higher market price than that from the other West Indies. But it does not stand to reason that the rum from Demerara and Trinidad and the Leeward Islands, though such rum does not contain the proportion of flavouring ethers that Jamaica does, is not quite as much entitled to the name of rum.

It actually happened in the Stockport case of eighteen years ago, that the analysts took Jamaica rum as their sole standard as to ether contents, and condemned all other West Indian rum.

The *West India Committee Circular* suggests that the proper course to have adopted would have been, by united West Indian action, to endeavour to put a stop to the sale of *imitation* rums. It goes on to express itself as follows:—

‘Anything that tends to hinder trade by hampering it with conditions and apprehensions must be prejudicial to it in the long run, and the worst of it is that not only is the Jamaica rum market likely to be affected, but the trade generally, by the present action of the Jamaica authorities, and this when the future of rum is more promising than it has been for some time.’



INSECT NOTES.

Ground Pearls.

Many residents in the tropics are familiar with the ground pearls which are often to be seen in the soil of garden plots, and cultivated fields. To tourists they are offered for sale either in bulk, or made up into necklaces. It is probable that very few persons realize that these interesting objects are made by insects, and are similar to the various scales and blights that infest many of the wild and cultivated plants in the West Indies.

The ground pearl is the waxy shell of a small insect which gradually builds up this protective covering from its body secretions. The shape varies, but as a general rule it is rounded. The size varies also. Many of them are small, but some reach a size of 6 m.m. ($\frac{1}{4}$ inch) in length, and many are 5 m.m. long.

The insect that makes this delicate waxy shell, has the technical name *Margarodes formicarium*. As has already been stated it is one of the scale insects, and it feeds by sucking the juices from the roots of plants by means of its slender proboscis.

Many of the ground pearls, when found, are the empty shells of insects which have died, but they may be found attached to the roots of plants, and in this latter event they contain the living insect.

They are to be seen at the roots of the sugar-cane, Indian corn, and of many garden plants. In Barbados, they are most abundant in the ground about guava trees, and in Montserrat, they are seen in clusters at the base of the common wild acacia (*Acacia tortuosa*), a very abundant shrub on waste lands in that island.

When ground pearls occur on crops of garden plants in sufficient numbers to cause any injury to the plants, they may be controlled by saturating the soil with a weak solution of whale oil soap (1 lb. of whale oil soap in 5 gallons of water), or a dilute solution of kerosene emulsion.

Shield-back Bug on Cotton.

In a letter to the Imperial Commissioner of Agriculture the Hon. Francis Watts, C.M.G., writes that a correspondent in Nevis states 'that there is a beetle, not the cotton stainer (*Dysdercus*), which makes a yellow spot on the cotton, which, becoming wet, suffuses a yellow colour over the lint.'

Specimens of the insect have been received and prove to be a species of the shield-back bug which was found in St. Lucia on wild cotton in 1903. (See *West Indian Bulletin*, Vol. IV, p. 276.)

The beetle-like appearance of this bug is due to the fact that the scutellum is developed to such an extent that it covers nearly the whole of the upper surface of the abdomen. The family of insects (*Scutelleridae*) to which this one belongs is not generally considered a serious pest to agriculture, and it is hoped that this one will be no exception to the general rule.

The same correspondent states that *Dysdercus*, by sucking the seed, injures it and causes the lint to be poor and weak.

The shield-back bug is of such rare occurrence in the West Indies that no remedies seem to have been tried. The method in use in dealing with the cotton stainers (*Dysdercus*) ought to be efficient with this similar insect. The method consists in knocking the insects off the bolls into a bucket or pan containing kerosene and water. This can easily be done when the insects are collected in numbers in the opening cotton bolls.

TESTING SEEDS.

In the *Agricultural News* (Vol. II, p. 153) directions are given for testing the germination of seeds. A description is there given of a simple seed tester, concerning which the following suggestions have been offered by Mr. A. H. Kirby, B.A., Agricultural and Science Master, Antigua.

It has been found that the cloth in which the seeds are placed encourages the growth of fungi, and that the proper cleansing of it after use is a matter of difficulty. By the use of a porous plate, placed in the lower dish of water, these difficulties are overcome. The porous plates recommended by Mr. Kirby are those manufactured by Messrs. Baird & Tatlock, 14, Cross St., Hatton Garden, E.C., price 2s. 6d. per dozen; but any other porous material should do equally well.

The lower plate is half filled with water, the porous one is placed in it with its rim resting in that of the former, and the whole covered by the glass plate as usual. The use of flannel is, therefore, not necessary, and the employment of such a modification affords increased cleanliness in working, and greater reliability of results.

IMPROVING TOBACCO BY BREEDING AND SELECTION.

Constant reference has been made in the *Agricultural News*, to the advantages which are to be derived from seed selection. Particular attention has been directed of late to this branch of work in connexion with the cotton industry, and at present seed selection experiments are being carried on by many of the cotton planters in the West Indies in conjunction with the officers of the Imperial Department of Agriculture.

An interesting account of improving tobacco by breeding and selection is given in the *Yearbook* of the U.S. Department of Agriculture for 1904, by Archibald D. Shamel:—

During the season 1901 and 1902, Florida-grown Sumatra seed was introduced into the Connecticut Valley, and grown extensively on the tobacco plantations of that region. The crops grown from this seed showed, however, a lack of uniformity, and only about 5 per cent. of the plants were typical Sumatra, the remainder being radically different from the parent type. The 1903 crop, grown from seed saved from 1902 according to the ordinary custom of tobacco planters, showed continued variation, and a reproduction of undesirable types. In 1903, seed was saved from typical plants; the flowers being protected from cross-fertilization by covering them with paper bags. In 1904, the plants grown from seed saved in this manner were strikingly uniform in type, and closely resembled the parent plants in all characters.

The change of type is doubtless due to the influence of the soil and climatic conditions, and by saving seed from typical plants, a desirable type is secured. This must be adapted to the local soil and climatic conditions.

VEGETABLE BUTTERS.

The following note on vegetable butters by Mr. P. Neill Gelston appeared in the *Pharmaceutical Journal*, for December 30, 1905:—

A correspondent recently asked, through the *Pharmaceutical Journal*, who are the makers of deodorised cocoa-nut oil, which is sold under various fancy trade names. As I think chemists should make themselves acquainted with this most useful 'white butter,' 'vegetable butter,' or deodorised cocoa-nut oil, I give a few names of the leading makers of this article, which is excellent for dietetic purposes, and fills a long-felt want for a pure fat free from animal matter. One of the last to manufacture, and certainly one of the best, is the firm of Joseph Crosfield & Sons, Warrington, well known to chemists as makers of the Erasmic and other toilet soaps. They call their brand of vegetable butter 'Veberine,' pronounced by vegetarians throughout the kingdom and abroad to be the purest fat ever introduced. Messrs. Broomfield & Co., Upper Thames Street, London, E.C., were one of the first to prepare this article, which they call 'Albene.' The vegetarians' butter, pure, colourless, odourless, tasteless vegetable fat, nutritious, and easily digested, never goes rancid. Messrs. Loders & Nucoline, Silvertown, London, are also large manufacturers, and call their brand 'Nucoline.'

The Orient Company, St. Mary-at-Hill, London, E.C., make a brand called 'Cocolardo,' which can be obtained in 2-lb. lever-lid tins, printed in colours. The vegetable butter may also be obtained from the makers named, in bulk, at about 38s. per cwt., and in 28-lb., 14-lb., and 7-lb. tins. From a lengthy experience in the use of vegetable butters, I can most heartily recommend chemists to make a practical trial of it in their homes, and to put it up as a specialty they can recommend with confidence to their customers, and be rewarded with frequent repeat orders. Vegetable butter is incomparably superior to animal lard, which is so indigestible to many, and it advantageously replaces the latter in cooking and frying. Cocoa-nut butter does not replace butter made from cream for the popular bread and butter, but I may state here there are other vegetable butters made from various nuts—almond, walnut, cocoa-nut, pea-nut, Brazil nut, etc., or a mixture of these, which do advantageously take the place of butters made from the cream of milk. These also are used to a considerable extent, and I will refer to them again. As already stated, the deodorised cocoa-nut oil, or vegetable butter, is 'colourless, tasteless, and odourless,' looking exactly like the best Cochin cocoa-nut oil of the pharmacy, the odourless portion of which is removed by pure spirit of wine. I think this might form a useful 'side-line,' as indeed it deserves to be such in every pharmacy, and sold under any suitable name, such as 'white butter,' or 'vego butter,' but, if sold as a 'butter,' I think it would find a readier sale if lightly coloured with the addition of a little butter-colouring, as used so much to give a richer tint to ordinary butter, and if offered as 'vegetable lard' it would then need no such addition. Each chemist should adopt a special name, and the uses of the butter should be freely set forth on the labels. The butter may be put up in 1-lb. and 2-lb. lever-lid tins, also sold loose in $\frac{1}{2}$ -lb. and 1-lb., and weighed as wanted on vegetable parchment paper, then a label affixed, and sold at 7d. or 8d. per lb.

Now, I would suggest to chemists to melt very gently some of the hard vegetable butters, sold as vegetable suet, or 'Vejsu,' as Messrs. Loders & Nucoline name it. It is put up in 1-lb. paper packets, and in appearance resembles the best beef suet after it has been melted, strained, and cooled.

Then add sufficient of the deodorised cocoa-nut oil to the melted vegetable suet to give a suitable mixture, and in the colder months of the year, when the vegetable butter becomes too stiff to rub into pastry, to melt the 'butter' gently and add sufficient nut oil of the best quality; I mean the *Oleum Nucis* used so largely in pharmacies, and so always to offer it of a consistence a little firmer than lard, but lightly coloured, when fluid, with butter-colouring to a butter-like colour, as already suggested. This nut oil is also largely used by vegetarians for frying purposes, and is taken as a substitute for cod liver oil. Vegetarians and many confectioners and biscuit makers were quick to recognize and make such use of the vegetable butter that it is now made in great quantities every year, and, but for the drawback I have pointed out of becoming too soft in summer and too hard in winter, would have been used more extensively in households. It now remains for chemists to remedy and profit by this defect from a user's point of view. I would also advise, as another profitable 'side-line,' the vegetable suet mentioned above. It can be sold in paper packets at about 8d. per lb., and it, too, is excellent for frying purposes, cake making, etc., and is preferred by many to the soft vegetable butter. It is always of the same consistency, but more easily shredded than the *Oleum Theobromatis* or cacao butter of the *Pharmacopœia*. To use the vegetable suet, a little is cut or shredded off with a knife, and, if for frying, heated in a pan. The food to be fried is then added; or for cakes, etc., soften a little of the sliced-off 'suet' in a bowl with a gentle warmth, and the flour, etc., rubbed in it. For mince-meat, plum puddings, etc., it is cut up fine like the ordinary suet. These vegetable butters being quite free from moisture, it is found in use that 6 oz. are usually equal to 7 oz. or 8 oz. of butter or lard, and this fact should be stated on labels or wrappers.

(To be continued.)

ARABIAN COFFEE IN GRENADA.

In his monthly report for December last, Mr. G. F. Branch, the Agricultural Instructor at Grenada, furnishes the following information on Arabian coffee in that colony:—

On the Waltham estate, St. Marks, the property of the Hon. C. M. Browne, I came across a very interesting field of Arabian coffee. The trees were wonderfully free of the coffee miner, and although I am told that not much attention is paid to it, the trees appear very healthy and surpass any coffee seen by me in the virgin forest land in Dominica.

We may add that excellent Arabian coffee is also grown by the Hon. D. S. deFreitas at Dougalston in the same island. A sample of this coffee, which had been kept for three years, lately forwarded to this Department, proved to be equal to any coffee produced in the West Indies, with the possible exception of the celebrated Blue Mountain coffee of Jamaica.

Barbados Sugar in Trinidad. In a short note on the sugar industry, the *Port-of-Spain Gazette*, in its issue of January 14 last, writes as follows: 'It will be remembered that last year, owing to the increased quantity of grey crystals which were made locally for the American market, there was a great scarcity of the usual light grade molasses sugar, and to supply the wants of their retail customers, dealers in this produce got down trial shipments of muscovado from Barbados. We now learn from more than one of the large purchasers that the business thus opened with the sister colony will, in all likelihood, be continued this year.'



GLEANINGS.

At a general meeting of the Grenada Agricultural and Commercial Society held on November 24, 1905, Mr. R. D. Anstead, B.A., the Agricultural Superintendent, read a scheme for a Prize Holdings Competition, which it was agreed to start. Mr. Anstead was thanked for his suggestion.

The *Port-of-Spain Gazette*, in its issue of January 9, states that the latest novelty in vegetables is a black potato, which has been sent to Messrs. Sutton, the famous seed merchants of Reading, England. This eccentric tuber came from Congo, and is said to have an excellent flavour. It is especially recommended for ornamental cookery, and in salads.

In its issue of January 20, the *Demerara Argosy* writes as follows: 'Broom corn is being cultivated at the Penal Settlement and at Suddie, where it is growing fairly well. The corn is harvested, and sent to the Georgetown jail for conversion into brooms. The Inspector of Prisons hopes that a marketable article will be produced, and that eventually there will be a demand for the dried corn.'

Last year, the Harvey Engineering Company, Limited, erected the first patent Naudet process plant in the West Indies, which worked through the whole crop and gave a result ahead of the work done by the ordinary mills during the previous year. This plant has been extended and improved so that a still better result is looked for in the coming crop. (*Glasgow Herald*, December 30, 1905.)

As a result of experiments made under the auspices of the Board of Agriculture with regard to rice cultivation, his Excellency has approved of the free distribution to bona fide rice planters of not more than 1 gallon of the various kinds of rice seed which are regarded as being best adapted to the systems of milling and curing practised in this colony, and to the production of the best quality of rice both for local consumption and export. Applications should be sent to the Superintendent of the Botanic Gardens. (*Demerara Daily Chronicle*, January 30, 1906.)

At the monthly meeting of the Board of Agriculture in Jamaica, held on December 12, 1905, his Grace the Archbishop moved the following resolution which was unanimously agreed to: 'That the Board of Agriculture is satisfied of the fact that the successful development of various industries in Jamaica will largely depend upon the advice and guidance of a competent entomologist, and therefore earnestly recommends the Government to make provision for the appointment of such an officer at the earliest possible opportunity.'

Speaking of labour-saving appliances, the *Port-of-Spain Gazette* of January 10 last, says that a steam plough has been installed on the Colonial Company's plantation, 'Harmony Hall.' In the Caroni district similar ploughs have been at work for some time, and have given excellent results. The company's premier estate, the Usine St. Madeleine, is well equipped with this and all other labour-saving appliances.

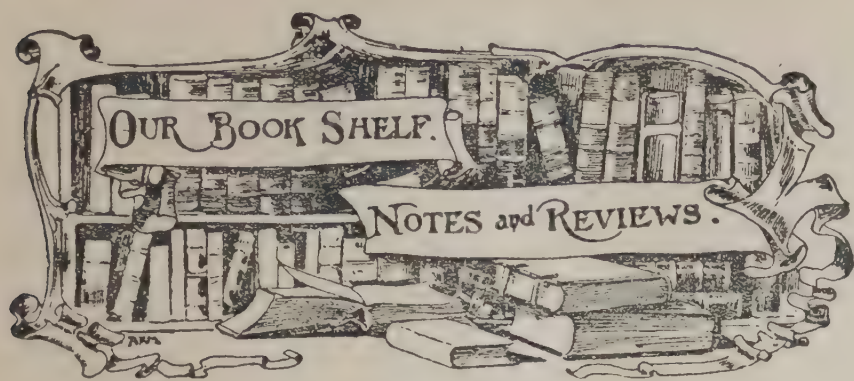
A notice by the Superintendent of the Royal Botanic Gardens, Trinidad, appeared in the *Trinidad Royal Gazette* of January 25, to the effect that 120,000 plants of cuttings of various kinds of seedling sugar-canes are now available for distribution to planters. These plants have been tested at the Experiment Station, St. Clair, and will be delivered free of charge from February 1, the applications being taken in the order received.

The following is extracted from a letter of the Agricultural Superintendent in St. Kitt's to the Imperial Commissioner of Agriculture: 'The two ginneries at Spooners and Stone Fort are in full work, and the lint in both places is clean and appears to be of good quality. Large returns of seed-cotton are being reaped on most of the estates, and every effort is being made to pick the cotton so as to get the land in readiness for planting cane. Shipments of cotton are going on by every mail.'

Messrs. Wolstenholme & Holland, Liverpool, writing under date of January 11 last, regarding the cotton market, state: 'During the past fortnight a moderate business has been done in Sea Island descriptions, and prices continue firm. Our latest advices from Savannah state that the market there was quiet, with holders refusing to accept lower prices. Spinners, however, had withdrawn from the market, and it seemed likely that factors might have to accept easier rates. Estimates of the crop now reach 100,000 bales.'

The following is an extract from a letter, dated January 12, 1906, from the Secretary of the West India Committee to the Imperial Commissioner of Agriculture, relative to the formation of an association for furthering the sale of West Indian produce: 'We understand that an association is about to be formed in London with the object of furthering the sale of West Indian produce of all kinds on a larger scale than heretofore. It is stated that the old established firms of the Pure Cane Sugar Company, and Messrs. James Philip & Co., which for over twenty years have devoted themselves to the sale of such commodities, are to be taken over by the association, and developed considerably.'

In a note on the banana trade, the *Port-of-Spain Gazette* in its issue of January 23 last, contains the following extract from the *Boston Herald*: 'The importations of bananas at the port of Boston have been very heavy during the past year, being 1,057,652 bunches more than in 1904. The total receipts for the year were 3,964,101 bunches, against 2,906,449 bunches for 1904, and 3,037,279 bunches in 1903. Prices ruled fairly low during the early part of the year, owing to the very heavy supply during the best season, but soon became higher, and closed the year at the highest point, almost on a level with a range of prices at the end of 1904. The United Fruit Company has had 122 arrivals at the port of Boston during the year, including ninety-six from Jamaica, sixteen from Costa Rica, and ten from San Domingo.'



THE SCIENCE YEARBOOK AND DIARY FOR 1906. (By Major B. F. S. Baden-Powell, London: Messrs. King, Sell & Olding, Ltd., 27, Chancery Lane. Price 5s.

The second number of this useful book has just been issued. Amongst the interesting contents of this volume is to be found a condensed resumé of some of the more important work that has been accomplished in science during the last twelve months.

The various branches of science are treated separately. Under botany, we find that one of the chief pieces of work performed this year is the beginning of 'the North American Flora.' This work, when completed, will comprise thirty volumes, and will contain all the indigenous plants growing in North America, Central America, and the West Indies, except Trinidad, Tobago, and Curaçao.

Further articles contain a list of the principal science works of the year, a list of the scientific and learned societies of England and America, with their objects, and a biographical directory of the well-known men of science.

Such a collection of information as is given in this volume is very useful to all interested in the progress of science, and should be fully appreciated.

BANANINE FLOUR AND BREAD.

Referring to the West Indies, the *Colonizer* in its issue of January 1906, states that remarkable strides are being made in systematic attention to agriculture, the culture of tropical products, and the development of new ones; and that this advance is due largely to the initiative and splendid work done by the Imperial Department of Agriculture in these islands, and by the West India Committee in England. The writer of the article goes on to mention one important industry which is entirely of to-day—'Bananine'—a product of Jamaica.

'Bananine' is a flour product derived from the banana. The natives of Central Africa manufacture a crude flour from this fruit; and speaking of this, the late Sir H. M. Stanley said, that if only its virtues were publicly known, it would be largely consumed in Europe, especially by infants, persons of delicate digestion, dyspeptics, and those suffering from temporary derangement of the stomach.

The flour now placed upon the market under the name 'Bananine,' made in British factories from British Colonial products, is far superior in quality to the native-made product, and possesses a higher value as food than even beef, containing, as it does, as high a percentage of proteids, whilst its caloric or energy value is almost four times as great.

'It is from this product,' says the *Colonizer*, 'that is derived the now well-known "Bananine" bread—the result of practical and scientific experiments carried over a considerable period—possessing all the qualities of a perfect food, combined with pleasant appearance and flavour. The nutritive properties of "Bananine" bread are present in the most easily available form of assimilation, and are certainly appreciated by those suffering from dyspepsia and other forms of digestive disorders. It appears as palatable and digestible when freshly baked as when several days old, nor does it become dry even after keeping. It is certainly not a luxury, but an everyday article of food, at a price within the reach of all, and has a pleasant flavour similar to that of the best wholemeal bread.'

RATIONS FOR A PEDIGREE BULL.

The following particulars have been furnished in respect of the rations and treatment for a pedigree bull in one of the Northern Islands:—

Morning.

1 quart of oats.	} Mixed together and made into balls.
1 " " finely crushed corn.	
1 " " oil meal.	
$\frac{1}{2}$ " " molasses.	

Noon.

1 quart of oil meal.	} Made into a mash.
$\frac{1}{2}$ " " molasses.	
$\frac{1}{2}$ " " bran.	

Night.

1 quart of oil meal.	} Made into a mash.
$\frac{1}{2}$ " " molasses.	
$\frac{1}{2}$ " " bran.	

It may be added that the bull is cleaned and brushed down every morning, then turned out on the pasture with the flock, and put up at night in a covered pen. When a similar bull is not turned out with the flock he should be regularly given exercise morning and evening.

FIBRE PLANTS IN THE VIRGIN ISLANDS.

The Agricultural Instructor at Tortola has recently forwarded the following specimens of fibre plants growing in the Virgin Islands:—

- (1) Very common everywhere and locally known as Karatto or Coryata (*Agave Karatto*). This is common also in other of the Leeward Islands.
- (2) Not very common but grown freely and could be easily cultivated. Bowstring Hemp (*Sansevieria guineensis*, broad-leaved form).
- (3) Not common, only occurring in a few places. Silk Grass (*Furcraea gigantea*, var. *willemeetiana*). The common silk grass of the West Indies is *Furcraea cubensis*, a slightly smaller plant than the above.
- (4) Very common and known as 'Wild Date.' Probably *Bromelia Karatas*, but the leaves are usually much longer.

On a previous occasion the Agricultural Instructor forwarded good specimen leaves of *Agave sisalana*, cultivated in Yucatan, Bahamas, and Turks Islands for the production of sisal hemp. There is a good opening at Tortola for a fibre hemp industry as land is cheap and offers favourable conditions.

DIRECTORS' FIRST ANNUAL REPORT.

The Directors are now able to submit their first Annual Report, together with a statement of the accounts to September 30, 1905, embracing the first year's working of the new factory.

The factory buildings, plant, machinery, etc., were supplied and erected under contract with the Mirrlees Watson Company, Limited, of Glasgow, and their work, as also that of Mr. Claude T. Berthon, the company's consulting Engineer, has given every satisfaction. The public opening took place on December 19, 1904, just eleven months after the contracts were given out.

Owing to prolonged drought, the cane crop on the island during last season was reduced to a figure which it has touched only three times in the last twenty years, and had it not been for the high prices that prevailed for sugar during the early part of 1905, the results of the year's working would have been disappointing. As it is, they have come fully up to, and have even exceeded, expectations, for, after paying all expenses, besides debenture interest, and setting aside the agreed sum of £2,000 for sinking fund, and also £1,000 by way of reserve fund, under the powers reserved to the Directors in the Articles of Association, there remains a surplus for the year of £3,956 9s. 8d. Of this, 2s. 6d. per ton, or £43, has been allocated to outside estates in respect of canes contributed by them. One moiety of the remainder, or £1,942 10s. 10d., is payable *pro rata*, to the 'contracting planters,' and equals nearly 2s. 6½d. per ton of canes. The other moiety belongs to the shareholders, but in view of the uncertainties of the future, it is thought prudent for the present not to distribute this, but to place it to their credit to be distributed hereafter, as circumstances may permit.

The factory was designed for an output of 3,000 tons of sugar per annum. Owing to the short crop, it will be seen that the output last season did not much exceed one-half of this, the planters supplying under 15,500 tons, and the peasants only 181 tons of canes, instead of the 25,500 and 4,500 tons, respectively, that were anticipated. As the expenses and fixed charges would not materially increase with a full output, it is evident that, in a normal year, sugar can be produced at this factory at a very low cost.

The accounts have been drawn so as to show results clearly, and in as much detail as is consistent with due brevity. The averages per ton of both production and cost are given.

Two of the Directors, Mr. DuBuisson and Mr. Moody Stuart, paid visits to the island at different dates, in order to overlook the arrangements, and to keep in touch with the staff. They were well satisfied with all they saw, and can testify to the industry and efficiency of all the officials and employees of the company.

In accordance with the Articles of Association, Mr. DuBuisson retires from the Board of Directors, but is eligible for re-election. The firm of Messrs. Wenham, Angus & Co., Chartered Accountants, London, were nominated by the board as auditors of the company. They retire, but offer themselves for re-election.

THE ANTIGUA SUGAR FACTORY LIMITED.

BALANCE SHEET, SEPTEMBER 30, 1905.

LIABILITIES.							
		£	s.	d.	£	s.	d.
To creditors...	... ..				564	11	8
To share capital.—							
12,500 'A' shares, 1s. each, fully paid		625	0	0			
12,500 'B' „ 1s. „ „ „		625	0	0	1,250	0	0

To debentures.—	£	s.	d.	£	s.	d.
250 'A' debentures, £ 100 each ...	25,000	0	0			
15 'B' ,, £1,000 ,, ...	15,000	0	0	40,000	0	0

To reserve fund				1,000	0	0
To profit and loss.—						
Balance at credit of profit and loss account				3,928	1	8
				<u>£46,742</u>	<u>13</u>	<u>4</u>

ASSETS

	£	s.	d.	£	s.	d.
By cash in hands of agents ...	994	1	2			
„ debtors	588	17	7			
„ stocks and stores in Antigua ...	1,010	19	10			
„ stocks of materials and spare parts	790	0	0	3,383	18	7

By capital expenditure.—

	£	s.	d.			
Land, buildings, plant and machinery	33,815	12	1			
Dwelling houses and other buildings	1,279	9	7			
Railway construction	5,518	13	11			
Railway rolling stock	2,548	9	7			
Preliminary expenses	946	9	7			
Discount on debentures	1,250	0	0			
Deduct.—	45,358	14	9			
Written off by way of sinking fund	2,000	0	0	43,358	14	9
				<u>£46,742</u>	<u>13</u>	<u>4</u>

PROFIT AND LOSS ACCOUNT FOR THE YEAR ENDED

SEPTEMBER 30, 1905.

To canes purchased.—					
	£.	s.	d.		
	Tons.	cwt.	qr.	s.	d.
Contracting planters 15,333 17 1 11 7 per ton	8,885	5	5		
Outside estates „ 344 0 0 12 9 „ „	219	7	7		
Peasant growers „ 182 5 3 11 4 „ „	103	15	2		
	<u>15,860</u>	<u>3</u>	<u>0</u>	<u>11 7</u>	<u>„ „ 9,208 8 2</u>

To factory charges.—

	£.	s.	d.		
Salaries	1,080	18	1		
Wages	828	10	7		
Fuel	337	8	7		
Stores, including bags	603	2	6		
Repairs and maintenance ...	710	0	9		
Fire and storm insurance ...	138	5	9		
Cartage and lighterage of sugar	387	4	11	4,085	11 2

(Per ton of sugar, £2 10s. 0d.)

To railway transport expenses.—

Wages	91	11	5		
Fuel	57	16	0		
Stores	35	0	0		
Repairs and maintenance ...	183	1	10	367	9 3

(Per ton of sugar, 4s. 6d.)

To administration charges.—

Directors	250	0	0		
Travelling	140	9	3		
Legal and professional	50	0	0		
Stationery, books and petties	55	14	1		
Telegrams and postage	168	0	5	664	3 9

(Per ton of sugar, 8s. 0d.)

To interest.—	£	s.	d.	£	s.	d.
Debenture interest	1,434	14	6			
Less credits	99	14	3	1,335	0	3
To sinking fund	2,000	0	0			
„ reserve fund	1,000	0	0			
To balance.—						
Payable to outside estates (say 2s. 6d per ton of canes)	43	0	0			
Payable to contracting plant- ers (say 2s. 6½d. per ton of canes)	1,942	10	10			
Shareholders proportion ...	1,942	10	10	3,928	1	8
				£22,588	14	3
By net proceeds of sugar, etc., produced—						
	£	s.	d.	£	s.	d.
Sugar 1,634½ tons (£12 15s. 5d. per ton)...	20,873	9	11			
Molasses, 77,000 gallons (5¼d. per gallon)	1,685	4	4	22,558	14	3
By sundries... ..				30	0	0
				£22,588	14	3

ABSTRACT OF WORKING OF THE FACTORY DURING 1905.						
Tons of cane				15,860	6	
Gallons of diluted juice *				2,437,500		
Cane sugar in juice, pounds				4,427,472		
Sugar made 1st. 1,600 tons)						
„ „ 2nd. 35½ tons = „ 30 „ }						
Sugar made, as 1st. sugar, tons				1,630		
„ „ „ „ „ pounds				3,651,200		
Commercial sugar per 100 of cane sugar in juice, i.e., 'extraction'				82	46	
Gallons of molasses... ..				77,000		
Molasses per ton of sugar				47	24	
Tons of cane per ton of sugar				9	73	
Cords of wood used... ..				371		
Tons of coal (chiefly locomotives)				57		
Days working				86		
Hours grinding				1,063		
* Average composition of diluted juice.						
Cane sugar. 16.89 per cent., 1.835 lb. per gallon.						
Glucose and non-sugar 2.04 „ „						
Total solids 18.93 „ „						
Purity 89.23 „ „						
Average sucrose in megass 7.6 per cent.						
„ water „ „ 49.5 „ „						
NOTE.—The canes have yielded 10.31 per cent. of sugar or 9.70 tons of canes to 1 ton of sugar.						

Colonial Secretary, Antigua, reviewing the experiments in the cultivation and selection of improved varieties of sugar-cane in the Leeward Islands:—

At Antigua, in the experiment with plant canes during the season, the results show that seven canes, viz., B. 156, Sealy Seedling, B. 306, B. 208, D. 74, D. 95 and D. 109 stand out as specially worthy of attention. They are therefore to be recommended as worthy of being safely, though cautiously, introduced into cultivation in Antigua. This opinion is strengthened on reference to the results with the experiments with ratoons, for the same six canes have done best at the various stations as ratoons also.

At St. Kitt's, the best results as plant canes were obtained with Caledonian Queen or White Transparent. B. 208, and B. 147 were grown in St. Kitt's with satisfactory results. B. 74 and D. 116 are also recommended for cautious planting. B. 208 heads the list of canes grown as ratoons in these experiments with a yield of 30 tons of cane and 8,508 lb. of sugar in the juice. Dr. Watts is of opinion that this cane may be generally introduced into cultivation in St. Kitt's where it will occupy a useful position with the Caledonian Queen and B. 147.

It is a matter of gratification that the cane fields throughout the colony show an almost complete absence of rotten canes. As pointed out by Dr. Watts, the relief from anxiety on this score is directly traceable to the introduction of new varieties of canes—a policy that has been steadily advocated and encouraged by the Imperial Department of Agriculture. The great value and importance of these experiments are therefore obvious.

Facts about B. 208. A report on the sugar industry of British Guiana, which was published in the last number of the *Agricultural News*, states that Cane 'B. 208 has, generally speaking, not succeeded well, and it evidently requires special soil and climatic conditions.'

This statement is rather surprising in view of the reports that have from time to time been published with reference to B. 208. Mr. John M. Fleming, Manager of plantation Diamond, British Guiana, in a letter to the Imperial Commissioner of Agriculture dated March 27, 1904, (see *Agricultural News*, Vol. III, p. 180) writes: 'B. 208 is, in my opinion, the best cane you have given us, so far. A very strong point in its favour is that in every trial I have made of it, I have invariably found the juice of excellent quality.'

Mr. Fleming's report on the canes reaped during the period January to June 1905 at plantation Diamond (see *Agricultural News*, Vol. IV, p. 242), shows that B. 208 stood second in yield, and that the acreage of this variety increased from 1,288 acres in December 1904, to about 1,600 acres in June 1905.

From the Report of the Director of the Experiment Stations in Queensland, it appears that West Indian Seedling canes give good results. 'The cane of all those experimented with, which gave the highest percentage of sucrose and the highest quotient of purity was B. 208 (see *Agricultural News*, Vol. IV, p. 274).

In Jamaica also, B. 208 has done especially well (see *Agricultural News*, Vol. IV, p. 83).

The note on Sugar-cane Experiments in the Leeward Islands, on this page, also shows the high position maintained by B. 208 in those islands.



SUGAR INDUSTRY.

Sugar-cane Experiments in the Leeward Islands.

The following extract is taken from the letter of the Imperial Commissioner of Agriculture to the

MARKET REPORTS.

London,—January 19, 1906. Messrs. KEARTON, PIPER & Co.; Messrs. E. A. DE PASS & Co.; 'THE WEST INDIA COMMITTEE CIRCULAR,'; 'THE LIVERPOOL COTTON ASSOCIATION WEEKLY CIRCULAR,'; and 'THE PUBLIC LEDGER,' January 13, 1906.

ALOE—Barbados, 15/- to 60/-; Curaçoa, 17/- to 75/- per cwt.
ARROWROOT—St. Vincent, 2d. per lb.
BALATA—Sheet, 1/4 to 1/11; block, 1/4 to 1/4½ per lb.
BEES'-WAX—£7 10s. to £7 12s. 6d. per cwt.
CACAO—Trinidad, 52/- to 60/- per cwt.; Grenada, 47/- to 51/6 per cwt.
CARDAMOMS—Mysore, 7½d. to 3/- per lb.
COFFEE—Jamaica, good ordinary, 38/- to 40/- per cwt.
COTTON—West Indian, medium fine, 6·65d.; West Indian Sea Island, medium fine, 13d.; fine, 14d.; extra fine, 15½d. per lb.
FRUIT—
BANANAS—Jamaica, 5/- to 7/- per bunch.
GRAPE FRUIT—5/6 to 8/- per box.
LIMES—4/- to 4/6 per box.
ORANGES—Jamaica, 6/- to 10/- per box of 176-200.
FUSTIC—£3 5s. to £4 per ton.
GINGER—Jamaica, 42/- to 52/- per cwt.
HONEY—21/- to 24/6 per cwt.
ISINGLASS—West Indian lump, 2/- to 2¼; cake, 1/3 to 1/4 per lb.
KOLA NUTS—4d. to 6d. per lb.
LIME JUICE—Raw, 9d. to 11d. per gallon; concentrated, £16 per cask of 108 gallons; hand-pressed, 2/3 to 2/6 per lb. Distilled Oil, 1/4½ to 1/5 per lb.
LOGWOOD—£4 to £4 15s.; roots, £3 10s. to £4 per ton.
MACE—Good bold pale, 1/6 to 1/7; pale and reddish, 1/4 to 1/5; red, 1/3 to 1/4 per lb.
NITRATE OF SODA—Agricultural, £11 5s. per ton.
NUTMEGS—53's, 2s.; 65's, 1s.; 74's, 9½d.; 84's, 8½d.; 95's, 6½d.; 104's, 5¾d. per lb.
PIMENTO—Fair, 2¾d. to 2¾d. per lb.
RUM—Demerara, 1/- to 1/1½ per proof gallon; Jamaica, 2/1 per proof gallon.
SUGAR—Yellow crystals, 14/- to 17/s per cwt.; Muscovado, 15/- to 15/6 per cwt.; Molasses, 11/- to 16/- per cwt.
SULPHATE OF AMMONIA—£12 12s. 6d. per ton.

Montreal,—December 12, 1905.—Mr. J. RUSSELL MURRAY. (In bond quotations, c. & f.)

COCOA-NUTS—Jamaica, \$27·00 to \$29·00; Trinidad, \$24·00 to \$25·00 per M.
COFFEE—Jamaica, medium, 10c. to 11c. per lb.
GINGER—Jamaica, unbleached, 7½c. to 10c. per lb.
MOLASCUIT—Demerara, \$1·00 per 100 lb.
MOLASSES—Barbados, 30c.; Antigua, 26c. per Imperial gallon.
NUTMEGS—Grenada, 110's, 18c. per lb.
ORANGES—Jamaica, \$2·65 per barrel, duty paid.
PIMENTO—Jamaica, 5¼c. per lb.
SUGAR—Grey crystals, 96°, \$2·12 to \$2·20 per 100 lb.
—Muscovados, 89°, \$1·60 to \$1·75 per 100 lb.
—Molasses, 89°, \$1·35 to \$1·50 per 100 lb.
—Barbados, 89°, \$1·45 to \$1·70 per 100 lb.

New York,—January 19, 1906.—Messrs. GILLESPIE BROS. & Co.

CACAO—Caracas, 13c. to 14c.; Grenada, 10½c. to 11c.; Trinidad, 11c. to 11½c.; Jamaica 9½c. to 9¾c. per lb.
COCOA-NUTS—Jamaica, \$24·00 to \$26·00; and Trinidad, \$23·00 to \$25·00 per M.
COFFEE—Jamaica ordinary, 8¼c. to 10½c. per lb.
GINGER—Jamaica, 7c. to 9½c. per lb.
GOAT SKINS—Barbados, Dominica, and Antigua, 50c.; Jamaica, 61½c. St. Kitt's, 51c. per lb.
GRAPE FRUIT—Jamaica, \$4·00 to \$6·00 per barrel.

MACE—31c. to 35c. per lb.

NUTMEGS—West Indian, 65's to 70's, 26c.; 80's, 22½c. to 23c.; 90's, 19c.; 100's, 17½c.; 110's, 14c.; 120's, 12c.; 130's, 10c. per lb.

ORANGES—Jamaica, \$3·00 to \$3·50 per barrel.

PIMENTO—4¼c. to 4¾c. per lb.

PINE-APPLES—No quotations.

SUGAR—Centrifugals, 96°, 3¾c.; Muscovados, 89°, 3½c. Molasses, 89°, 2¾c. per lb.

INTER-COLONIAL MARKETS.

Barbados,—January 27, 1906.—Messrs. T. S. GARRAWAY & Co., and Messrs. JAMES A. LYNCH & Co.] February 3, 1906.

ARROWROOT—St. Vincent, \$3·80 to \$4·25 per 100 lb.
CACAO—\$9·00 to \$9·50 per 100 lb.
COCOA-NUTS—\$10·00 per M. for husked nuts.
COFFEE—\$10·50 to \$11·75 per 100 lb.
HAY—95c. to \$1·60 per 100 lb.
MANURES—Nitrate of soda, \$65·00; Ohlendorff's dissolved guano, \$55·00; Cotton manure, \$48·00; Sulphate of ammonia, \$75·00; Sulphate of potash, \$67·00 per ton.
MOLASSES—13c. per gallon.
ONIONS—Lisbon, \$3·00 per 100 lb.
POTATOS, ENGLISH—Nova Scotia, \$2·25 to \$2·40 per 160 lb.
RICE—Ballam, \$4·45 to \$4·50 per bag (190 lb.); Patna, \$2·86 to \$3·25; Rangoon, \$2·50 to \$2·75 per 100 lb.
SUGAR—Muscovados, 89°, \$1·35; Dark crystals, 96°, \$1·80 per 100 lb.

British Guiana,—January 31, 1906.—Messrs. WIETING & RICHTER.

ARROWROOT—St. Vincent, \$8·00 per barrel.
BALATA—Venezuela block, 25c.; Demerara sheet, 38c. per lb.
CACAO—Native, 13c. to 14c. per lb.
CASSAVA STARCH—\$4·00 per barrel.
COCOA-NUTS—\$10·00 to \$12·00 per M.
COFFEE—13¼c. to 13¾c. per lb.
DHAI—\$4·80 to \$4·90 per bag of 168 lb.
EDDOES—72c. to \$1·44 per barrel.
ONIONS—Lisbon, 3c. per lb. (ex store).
PLANTAINS—12c. to 36c. per bunch.
POTATOS, ENGLISH—\$2·50 to \$3·00 per barrel.
POTATOS, SWEET—Barbados, 84c. per bag.
RICE—Ballam, \$4·50 to \$4·60 per 177 lb.; Creole, 64c. per bag (ex store).
SPLIT PEAS—\$5·80 per bag (210 lb.).
TANNIAS—\$1·20 per barrel.
YAMS—White, \$1·80; Buck, \$2·04 per bag.
SUGAR—Dark crystals, \$1·90 to \$2·00; Yellow, \$2·40 to \$2·50; White, \$3·25 to \$3·50; Molasses, \$1·75 to \$2·00 per 100 lb. (retail).
TIMBER—Greenheart, 32c. to 55c. per cubic foot.
WALLABA SHINGLES—\$3·00, \$3·75, and \$5·25 per M.

Trinidad,—February 2, 1906.—Messrs. GORDON, GRANT & Co.; and Messrs. EDGAR TRIPP & Co.

CACAO—Ordinary to good red, \$11·00 to \$11·25; estates, \$11·40 to \$11·60 per fanega (110 lb.); Venezuelan, \$11·50 to \$11·90 per fanega.
COCOA-NUTS—\$20·00 per M., f o b.
COCOA-NUT OIL—72c. per Imperial gallon (casks included).
COPRA—\$3·00 per 100 lb.
DHAI—\$4·00 to \$4·25 per 2-bushel bag.
ONIONS—\$2·00 to \$2·50 per 100 lb. (retail).
POTATOS, ENGLISH—\$1·40 to \$1·50 per 100 lb.
RICE—Yellow, \$4·40 to \$4·75; White, \$5·00 to \$5·60 per bag.
SPLIT PEAS—\$5·00 to \$5·25 per bag.
SUGAR—No quotations.



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If to these figures the amount and value of cotton exported for the nine months ended September 30 are added, the total exports for the year 1905 are found to be 3,956 bales, weighing 1,122,800 lb., and valued at £47,846.

These returns, which are arranged in tabular form on the next page, show the actual weights and the estimated value of cotton lint exported from the several islands, but do not make any allowance for the value of the cotton seed.

In an article on the Barbados cotton industry (*Agricultural News*, Vol. V, p. 33), it is stated that, in order to estimate the real value of the industry, the value of the seed must be taken into account.

The experience of the past three years has shown that seed-cotton generally yields 29 per cent. of lint, or, that from every 100 lb. of seed-cotton, 29 lb. of lint and 71 lb. of seed are obtained. At this rate, there would have been produced with the 1,122,800 lb. of lint exported during 1905, 2,748,924 lb. of seed, or 1,227 tons, which at £5 per ton (the value of cotton seed when sold to the oil factory for the purpose of extracting cotton seed oil), would be worth £6,135, making the total return for lint and seed £53,981. In addition to this, if the feeding and manurial value of the cotton seed meal be taken into account, there is a saving in the amount to be expended on other feed and manurial substances, which is of decided benefit.

Further, a certain proportion of the seed might be sold for planting purposes. If it be assumed that one-sixth of the total amount of seed is suitable for planting, and finds a market at 1½d. per lb., the value of the seed would be considerably increased. At this rate, 458,154 lb. of seed, for planting purposes, would realize £2,863 9s. 3d., while the remainder, 2,290,771 lb., at £5 per ton, would be worth £5,113 6s. 7d.

West Indian Cotton Industry.

RETURNS furnished by the Customs' Departments in the various West Indies show that there were exported from the West Indies during the quarter ended December 31, 1905, 265 bales and 15 bags of cotton, weighing 97,397 lb., and of the estimated value of £4,833.

It may be mentioned that in estimating the value of the Sea Island cotton lint, the Customs' authorities place this at 1s. per lb. In the article dealing with the cotton industry in Barbados, it was stated that this was under the average price, which was estimated at 1s. 2d. This would probably be a fair average for the West Indies for 1905.

Based on these estimates, then, the value of the cotton industry in the West Indies for 1905 would be as follows:—

894,256 lb. of lint, at 1s. 2d. per lb.	£52,164	18	8
228,544 lb. of lint, (Customs' return)	3,149	0	0
458,154 lb. of seed, at 1½d. per lb. ...	2,863	9	3
2,290,771 lb. „ „ „ £5 per ton ...	5,113	6	7

Total £63,290 14 6

This, it will be admitted, is a gratifying result for an industry not yet four years old. Great credit is due to those who have taken up cotton growing in so earnest and successful a manner, and have carried out so fully the advice of the Imperial Department of Agriculture.

The present indications are that the returns in 1906 will be larger, even, than those of 1905, by some 30 to 40 per cent.

Following are the tables already referred to, giving the details for the several islands:—

Statement showing the amount of Sea Island cotton exported from the West Indian Colonies (in order of output) for the period January 1, to December 31, 1905:—

Colony.	Bales.	Weight in pounds.	Estimated value.
Barbados ...	967	344,232	£17,212
Nevis ...	724	144,721	7,236
St. Vincent ...	298	97,152	4,858
St. Kitt's ...	296	87,080	4,354
Montserrat ...	170	82,287	4,114
Grenada (Marie Galante) ...	704	212,722	2,693
Antigua ...	296	52,656	2,633
Jamaica ...	225	50,051	2,486
Anguilla ...	163	31,977	1,599
Trinidad and Tobago ...	42	12,981	386
Virgin Islands ...	21	4,100	205
British Guiana ...	10	1,453	38
St. Lucia ...	40	1,388	32
Total ...	3,956	1,122,800	£47,846

Statement (furnished by the Customs Department in each case) showing the amount and estimated

value of Sea Island cotton exported from the various West Indian Colonies during the quarter ended December 31, 1905:—

Colony.	Bales.	Weight in pounds.	Estimated value.
Barbados ...	176*	62,234	£3,462
St. Kitt's ...	42	10,181	509
Montserrat ...	24	11,564	578
Jamaica ...	24	4,823	225
Anguilla ...	5	1,000	50
St. Lucia ...	7*	400	7
British Guiana ...	2	195	2
Total ...	280*	97,397	£4,833

* This includes bales and bags.

CANADIAN EXHIBITIONS IN 1906.

In the *Agricultural News* for December 23, 1905, reference is made to the Canadian exhibitions to be held at Toronto and Halifax in 1906.

In a recent letter to Messrs. Pickford & Black in regard to these exhibitions, the Imperial Commissioner of Agriculture asked for an estimate of the amount likely to be required for arranging a court for the exhibits in case the West Indies should contribute to the exhibition. The Imperial Commissioner further stated that he had advocated the desirability of action being taken by these colonies, and trusted that systematic efforts would be made to send forward good commercial samples, for the purpose of fully representing the resources of these colonies, and of placing them in a prominent manner before the Canadian people.

The following is from Messrs. Pickford & Black's reply to the letter of the Imperial Commissioner:—

'Your letter of 10th. instant, and the cuttings from the papers have been received, and we have read the same with much pleasure. You seem to be giving the exhibition every publicity possible, and we hope your efforts will result in a good exhibit.

'With regard to cost, we think the outside amount to be contributed by the West Indies will be £100. This amount has been made up after carefully seeing what other exhibitions cost us, and will cover both the Toronto and Halifax exhibitions.

'The printed matter for the exhibitions is not yet published, but will be in the course of the next month, when a supply will be obtained for you and sent out for your distribution.

'It is our intention to have a special excursion rate for this exhibition, with the view of endeavouring to induce a number of West Indians to visit Canada.'

DEPARTMENT NEWS.

The Imperial Commissioner of Agriculture left Barbados by the R.M.S. 'Esk,' on February 22 on a visit to the Northern Islands. It is probable that he will return to Barbados during the next week.



SUGAR INDUSTRY.

Demerara Seedlings.

The Demerara seedlings D. 74 and D. 95 seem to have found favour with sugar planters in Louisiana. The *Sugar Planters' Journal*, in its issue of January 27, 1906, comments favourably on the rapidity with which these canes have increased in acreage during the past few years. It is estimated that nearly four-fifths of all the sugar planters have introduced one or both these canes into their cultivations, and that the plantings in 1906 will be chiefly of these seedlings. The *Sugar Planters' Journal* says: 'Should the seedlings hold up as they have done, we look for at least two-thirds of Louisiana's cane areas to be planted with them, two to three years hence.'

The *Louisiana Planter and Sugar Manufacturer* for February 3, 1906, contains an article headed 'D. No. 74 in Blossom.' From this article it appears that D. 74 has arrowed in Louisiana during 1905, while none of the older canes are reported to have done so. This is taken to prove that D. 74 has a shorter cycle of growth than the old-established canes of Louisiana, and this, with its much higher saccharine content, tends to make it a valuable cane for use in that state. The following is quoted from the article referred to:—

'Now we have D. 74 largely introduced among the sugar planters of the state, of admittedly high sugar content, and displaying every evidence of maturity, while our older varieties remain immature. All this would indicate that, for us in Louisiana, owing to our short grinding season, D. 74 may be found to be a better cane than we have thus far given it credit, and its general use in the cane fields of our state may bring us relief that we can hardly reach in any other direction; that is sweeter canes, and canes more cheaply harvested, owing to their erectness.'

Sugar-cane Experiments in the Leeward Islands.

In reviewing the report on the sugar-cane experiments in the Leeward Islands for 1904-5, recently issued by the Imperial Department of Agriculture, the *Barbados Agricultural Reporter*, January 25, 1906, concludes as follows:—

The Commissioner of Agriculture mentions as a matter for gratification that the cane fields throughout the Leeward Islands' colony show an almost complete absence of rotten canes. Dr. Watts is quoted as saying that the relief from anxiety on this score is directly traceable to the introduction of new varieties of canes. This is a policy which is well known to have been steadily advocated and encouraged by the Imperial Department of Agriculture. The Commissioner accords credit to Dr. Watts and his colleagues for the manner in which these experiments were carried on. The value and importance of the experiments conducted under the direction of the Department of Agriculture cannot be too highly estimated, for the knowledge gained thereby enables sugar-cane planters to avoid much loss both of time and of money, and places them in a position to pursue the course calculated to secure the best returns from their lands. There is full

justification for the belief that the institution of these experiments has helped to avert a serious decline in the output of sugar by these colonies, by directing the planters' attention to the means for combating the ravages of fungoid diseases and insect pests. The continuance of the search for improved varieties of cane is essential to the improvement and maintenance of the sugar industry.

Notes on Sugar Machinery.

In Jamaica, an effort is being made to improve the sugar manufacture, and triple-effect evaporating apparatus and numerous sundries have been sent out. In the Danish West Indian Island of St. Croix, great attention has been paid of late years to improved extraction, and this year a nine-roller mill, preceded by a Krajewski crusher, all driven by one engine, has been supplied to one of the grinding stations of the central sugar factories, and a new vacuum pan and other accessories to another factory. (*Glasgow Herald*, December 30, 1905.)

During the year a number of new complete central sugar factories have been shipped from Glasgow for British India, for Natal, and for Japan. Further orders are in hand for sugar factories and refineries for various parts of the world, including a large central factory for the Fiji Islands. This is for a Canadian company, and will supply sugar for the Canadian sugar refineries, and take advantage of the preferential tariff given by the Canadian Government to all raw sugar made in the British Colonies. All which tend to improvement in this specialty of engineering in Glasgow. (*Glasgow Herald*, December 30, 1905.)

A NEW SUGAR MILL FOR BERBICE.

We learn that Messrs. George Fletcher & Co., Derby, have just constructed a new mill for Port Mourant plantation, Berbice, British Guiana. It consists of a very powerful three-roller mill, with cane-crushing rollers attached, the five-rollers being driven by one engine. The latter is, moreover, arranged so as to drive not only the five rollers already mentioned, but also additional mills which probably will be added later on, thus converting the grinding plant into an eleven-roller mill. (*International Sugar Journal*, January 1906.)

Sugar in Mexico.

The following note is taken from the *Louisiana Planter and Sugar Manufacturer* for February 10, 1906:—

The sugar news from Mexico is not very satisfactory. The sugar crop will probably be equal to that of last year, and of last year's crop it was necessary to export about one-fourth, the bulk of which went to England. In order to maintain prices for sugar in Mexico, a holding syndicate was formed, which, not being very successful, went into liquidation and still holds a limited amount of last year's crop. No provision has been made for the export of the surplus of this year's crop, and as exported sugars will now bring about half the price they did a year ago, every sugar planter will feel reluctant about joining any exporting syndicate, and will be anxious to sell what he can in the home market, as long as it is protected by their protective tariff on imported sugars. This will be all very well for them, if they can control the surplus and export it, for doing which no arrangement has thus far been made, and the successful control of which at the moment seems doubtful.



WEST INDIAN FRUIT.

TROPICAL FRUITS IN ENGLAND.

In the *Port-of-Spain Gazette* for February 6, 1906, a correspondent from Covent Garden, reviewing the English fruit trade for 1905, states that an immense volume of business was done in the importation of fruit, and that the most astonishing development was in connexion with the banana industry. At one time it was the orange, the apple or the tomato; to-day it is the banana that heads the list. The three great centres of production are the Canaries, Jamaica, and Costa Rica. The sum of over £2,000,000 is said to have been paid for the banana supply during 1905.

The following prices of tropical fruits at Covent Garden are taken from a letter of Mr. B. C. Orgill to the editor of the *Jamaica Gleaner*:—

Jamaica bananas, 3s. to 7s. per bunch; Jamaica grape fruit, from 10s. 6d. to 18s. per case; Madeira mangos, from 4s. to 6s. per dozen; St. Michael's pines, from 3s. 6d. to 5s. each; Spanish pomegranates, from 6s. to 12s. per case; Jamaica oranges, from 6s. to 10s. per case; Canary tomatoes, from 12s. to 14s. per nest; avocado pears (very inferior), 3s. to 6s. per dozen; cucumbers, from 8s. to 15s. per dozen; French pumpkins, from 4s. to 5s. each; Rangoon cocoa-nuts, from 10s. to 16s. per 100.

THE PUMELOW IN CHINA.

The *Journal of the Society of Arts* for January 19, 1906, contains an account of the growing of pumelows in China, from which the following extract is taken. Reference is made in this connexion to an article on grape fruit and shaddocks in the *West Indian Bulletin* (Vol. VI, p. 284):—

The United States Consul at Hangchow says that its bearing period, with ordinary Chinese care, probably ranges from twenty to twenty-five years. The tree apparently grows in any kind of ground, good soil, of course, producing more and better fruit than poor soil, but the habits of the tree require no particular soil or soil conditions. The best pumelows are grown in the lower portions of Fukien Province, and the upper portion of Kwantung Province. The best pumelows of the world are said to come from a little valley near Chang Chew, a large Chinese city in the interior from Amoy, which has not yet been opened to foreign trade, the village in this valley, named Po Nan, being the centre of the trade in fine pumelows. The pumelows grown there are

of exceptionally fine flavour and size, of splendid and showy appearance, and fetch high prices. So famous are the pumelows grown there, that each year a special tribute of Po Nan pumelows is sent to the Emperor at Peking. The summers in this valley are rather hot and damp, while in the winter there are a good many frosts. The temperature will often go as low as 28° F. and has been known to go as low as 25°, although damage was done at that time. The pumelow is grown far in the interior of China, having been reported as common, by travellers, in even the drier portions of Szchuan Province. The Chinese say that a good-sized tree will ordinarily produce from 600 to 700 pumelows, and when it is considered that many pumelows will run as large as 7 or 8 inches in diameter and even larger, it will be appreciated that such a tree is bearing a considerable load. The fruit is more oval than round. The structure and covering also are practically those of the grape fruit, except that the skin and pith padding may be somewhat thicker on the average, and the small globules of juice and fibre or 'meat' are more perfectly separated. Each section of the fruit contains a large number of seeds, but the seeds are close together on the inner edge of the section of the fruit, and are easily separated from the edible portion without breaking into the juice cells. The Chinese pick their pumelows, as they do all their fruit, too green to get the best results, and often the quality of the fruit is poor simply because it has not been allowed to ripen properly. This premature gathering of fruit probably also interferes with the maintenance of the highest quality of their seedling trees. Many of the producers practise grafting from trees of unusual merit, but the general rule is to grow trees from the seeds.

HOW TO CURE LEMONS.

The following suggestions for the curing of lemons are taken from the *Journal of the Jamaica Agricultural Society* for January last: Lemons should not be allowed to ripen on trees. They must be stem cut just before they begin to show yellow. They should then be piled or heaped on the floor in a dark, close room, and covered with blankets for forty-eight hours, which will cause them to sweat profusely. After being wiped dry, and put in single layers on shelves in a dark room, they must be left for a week or ten days until they begin to show a clear, straw colour. They should then be sized carefully, since they are sold by size, and then packed like oranges, in boxes. Lemons so prepared for market will keep for months in a perfect condition, there being no fear about their going bad in the way oranges do

AGRICULTURAL SHOWS.

Cottagers' Show at Carriacou.

The following account of the Cottagers' show held at Hillsborough, in the island of Carriacou, is taken from the report made to the Colonial Secretary of Grenada, by Mr. R. D. Anstead, B.A., Agricultural Superintendent.

The show was opened on January 26, 1906, by his Excellency the Governor of the Windward Islands, who, with his family, and accompanied by the leading public officers and members of Council, and a large party of ladies and gentlemen, arrived from Grenada in a special steamer:—

The display of stock was the main feature of the show, and this section was rendered especially worth seeing by the kindness of Mr. T. Archer who exhibited his thoroughbred stallion 'Rochester,' and some fine bulls, as well as other stock. A ram of his, a son of 'Black Rock,' the Anglo-Nubian ram belonging to the Imperial Department of Agriculture, elicited much admiration, as did 'Black Rock' himself, who was brought down by his Excellency, and is to remain in the island for some time. The Carriacou peasants may deservedly be proud of their stock; while all was good, perhaps the display of native cattle was the best.

After the stock, the exhibit which attracted the most attention was the cotton. Some very creditable Sea Island cotton was on view, and a sample sent by Mr. T. Archer was, in length of staple and general quality, equal to any I have seen in the West Indies. The ginnyery, containing saw and roller gins, was at work for the benefit of visitors, and a ginning competition was held.

The fruit and vegetable section did not do justice to the known capability of the island, but this was to be expected, as January is the wrong month for the harvest, and this section was bound to fall below the mark when the show had to be postponed from December. The long spell of dry weather, too, recently experienced, has been all against these products. In face of these circumstances, it was surprising what a large variety of vegetables and fruits was exhibited, but only one exhibitor in most cases was represented. The exhibits, however, served to indicate what the capabilities of the island must be under favourable circumstances, and it is hoped that next season nothing may prevent the show being held in the harvest, so that the cottagers may have an opportunity of doing themselves justice in this section. Some fine bunches of Chinese bananas were exhibited, and there was a good show of peas, while two samples of home-cured cacao were especially creditable.

The large variety of meals and starches exhibited deserve mention, as do the specimens of vegetable oils and lime juice; one sample of the latter, in particular, being of a high standard of merit.

An exhibit of sisal hemp calls for special comment. The prepared fibre, of splendid quality and whiteness, was shown together with some rope, two halters, and a hat manufactured from it.

Stone work, boot making, boat building, and basket work were all represented by specimens of good workmanship.

Before leaving for Grenada, his Excellency the Governor distributed some of the prizes.

The Commissioner and inhabitants of Carriacou are to be congratulated on the excellence of this, their first cottagers' show.

The sum of £11 0s. 10d. was distributed in prizes. This included a sum of £5 contributed by the Imperial Department of Agriculture, in addition to which four Diplomas of Merit were granted.

EDUCATIONAL.

St. Lucia Agricultural School.

The following is the report of the Examiner (Mr. F. A. Stockdale, B.A.) on the half-yearly examination of the Agricultural School in St. Lucia:—

Since the last examination eight of the senior boys have left, so that only four presented answers to the senior papers in this examination. Seven boys took the junior papers, and thirteen new boys have been admitted.

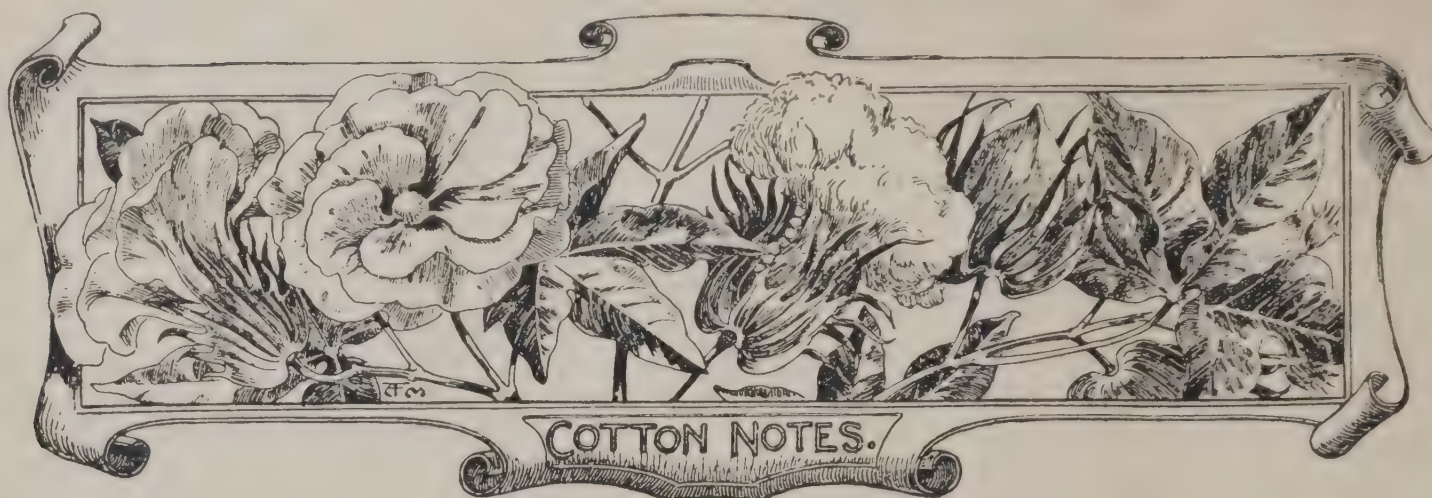
The work of the senior class is very satisfactory. Edgar came first with about 75 per cent. of the total marks. With the exception of agriculture, his papers are very good; some of his answers being excellent. DuBoulay came next with 67 per cent. of the total marks, but he has not shown much improvement since the last examination. Vincent is last with 47 per cent., his paper in arithmetic being particularly weak. The papers in agriculture throughout the whole class are weak, the boys knowing little about budding, or of the needs of cacao. It would be advisable to give more attention to this important subject, and it is hoped that considerable improvement will be shown in the next examination.

Of the seven juniors, four obtained over 50 per cent. The work, on the whole, is very uniform, the papers in arithmetic being the best of the more important subjects. Girard is again first with nearly 60 per cent. of the total marks, while Katty and Gabriel occupy, as before, the lowest positions. The latter is decidedly weak in the science subjects, particularly in agriculture. As in the last examination, the agriculture and botany papers are the worst, the agriculture being particularly weak. The boys should be discouraged from learning written notes of lessons off by heart, and should be given practical work to perform in the school gardens. More attention should be devoted to the agriculture and science of this class, and more interest might be taken in the different subjects if more experimental work is shown them. I think it advisable that these boys should continue with the junior course, none being ready for promotion.

Of the thirteen new boys, some sent in very good papers in arithmetic, the working being clear and neat, and the results accurate.

BANANA FIBRE.

Captain Baker, the founder of the United Fruit Company, gives it as his opinion that if some use can be found for the juice of the banana plant, it would pay to extract the fibre from the banana stems. The fibre averages 1.8 per cent. of the weight of the plant. Banana fibre would probably not sell for more than \$50 to \$100 per ton; the latter price being obtainable only in years when there is a shortage of sisal and manila hemp. It has been estimated that 20,000 acres of bananas would produce 9,000 tons of fibre per annum—worth from \$22.50 to \$45.00 per acre. If some use can be found for the acrid juice of the banana plant, the problem of profitable fibre extraction will undoubtedly soon be solved. (*Hawaiian Forester and Agriculturist*, January 1906).



COST OF LABOUR IN COTTON PRODUCTION.

The following extract of a letter from the Hon.^r Francis Watts, C.M.G., to the Imperial Commissioner of Agriculture, gives information as to the cost of the labour required to produce and market 1 lb. of cotton:—

In your letter of July 17, 1905, you inquired what proportion of the money spent on cotton growing actually reaches the labourer. Mr. Hollings prepared a most useful statement which, he informed me, he sent to you.

I have made inquiries from various people, some of whom give somewhat vague information. Upon carefully considering these replies, I arrive at the following approximations.

In Antigua, the amount spent on labourers' wages in producing 1 lb. of cotton lint was, for three estates, 6.12*d.*, 9.62*d.*, and 6.61*d.*, respectively; in Barbuda, 9.62*d.* (small crop; heavy expenses in clearing land). In Nevis, 4.93*d.* and 4.35*d.* (a small addition to be made for cost of labour in carting). In St. Kitt's, 3.0*d.* (as a catch crop), 4.4*d.* (as a cotton crop).

There can be no absolute fixed amount, for the cost will vary with the season and the quantity produced. The Nevis crops were large, and probably represent a low expenditure. I think you may assume that the labourer gets from 4½*d.* to 6*d.* for every pound of lint produced.

The following statements are from the report referred to above, prepared by Mr. J. Spencer Hollings, Agricultural Instructor at Nevis:—

Fifty acres of cotton on one estate produced 12,563 lb. of lint, an average of 251.3 lb. per acre. The total cost of production was £512 8*s.* 9½*d.*, an average cost of £10 4*s.* 11*d.* per acre, or an average cost per pound of lint, of 9.45*d.* The amount paid to labourers as wages was £271 17*s.* 8*d.*, which gives an average cost for labour per pound of lint produced of 5.73*d.*

The cost of labour amounts to 60.59 per cent. of the total cost of production.

SEA ISLAND COTTON MARKET.

The Sea Island Report, dated January 27, 1906, furnished by Messrs. Henry W. Frost & Co., of Charleston, South Carolina, contains the following:—

Islands.—There was some demand for the limited stock of odd bags classing fully fine at 23½*c.*, and several crop lots, aggregating about 150 bags, were sold on a basis of extra fine at 28*c.*, and extra extra fine 42*c.* to 45*c.* The stock now consists very largely of planters' crop lots, and odd bags

classing fine and below. The supply of odd bags classing fully fine and extra fine is small. We quote:—

Tinged and stained islands, 18*c.* to 20*c.* = 10½*d.* to 11½*d.*

Fine 22*c.* = 12½*d.*

Fully fine to extra fine 23½*c.* to 25½*c.* = 13¼*d.* to 14¼*d.*

Fully fine to extra fine planters' crop 26*c.* to 30*c.* = 14½*d.* to 16¾*d.*

Extra fine planter's crop lots 35*c.* to 40*c.* = 19*d.* to 22*d.*

The report dated February 3, 1906, gives the following information:—

Islands.—There was some demand for the limited offerings of fully fine at 23½*c.*, and extra fine at 25½*c.*, and to supply this demand some small crops were sold as grade cotton. Besides, several planters' crop lots aggregating 175 bags were sold at 25½*c.*, and the 40 Cherokee 36*c.* The buying was for England and France.

The unsold stock consists very largely of planters' crop lots, classing fully fine to extra fine held at 26*c.* to 30*c.*; and about 1,000 bags odd bags, classing fine and below, which are held on a basis of fine 22*c.*, tinged 20*c.*, stained 18*c.*

Messrs. Wolstenholme & Holland, writing under date of January 25, state:—

Since our last report there has been a fair business passing in Sea Island descriptions, and full prices have been paid. For extra quality of Barbados Sea Island 17*d.* has been paid, and there is a demand for such cotton. Our last advices from Savannah stated that the market was steady with a good demand. We do not look for any material change in prices for the present.

During the fortnight ended January 11, 90 bales of West Indian cotton were imported into the United Kingdom. Medium fine is quoted in Liverpool 6.65*d.* per lb.; West Indian Sea Island, medium fine, 13*d.* per lb.; fine, 14*d.* per lb.; and extra fine, 15½*d.* per lb. (*West Indian Committee Circular*, February 19, 1906.)

In the *Textile Mercury* of January 20, 1906, it is stated that the exports of Sea Island cotton from America this season amounted to 40,376 bales, or 15,906,269 lb., valued at \$3,223,271, or 20.3*c.* per lb.

The countries which took this cotton were the United Kingdom, France, Russia (European), Germany, and Canada. The quantity of this cotton exported has increased from 21,829 in 1887, to 40,376 bales, but the export price is still about the same. The export year of 1897 shows the largest quantity of Sea Island cotton taken by foreign countries, the total for the year having reached 55,824 bales.

COTTON IN ST. VINCENT.

The Agricultural Superintendent at St. Vincent, in a recent letter to the Imperial Commissioner of Agriculture, reports as follows:—

Up to February 6, 1906, 74,261 lb. of lint have been ginned at the central cotton factory, which is equal to over 206 bales, of a net weight of 360 lb. each.

So far, 171 bales have been shipped to the British Cotton-growing Association, but over 200 would have been shipped had the S.S. 'Naparima' been able to take 30 bales which Mr. Alex. Smith had ready on Thursday last.

The following notes have been received from the Agricultural Superintendent, in a letter dated February 20, 1906. With regard to cotton cultivation on the windward coast of St. Vincent he states:—

Cotton-picking is almost finished, but a good deal yet remains on hand to be sorted for the factory. The yield generally has been much better than last year. At Grand Sable, where the volcanic ash is still very noticeable, the return has been much better, although not so large as on estates where little or no ash fell. Only good cultivation and manuring, and the adoption of a system of green-dressing will bring the lands with a good deal of ash, back again to their original standard of fertility, and capacity for producing good average crops of cotton.

He says, further:—

To date, 87,649 lb. of lint have been ginned since work was started: this is equal to over 243 bales. This total is far in excess of last year's, notwithstanding that only about half the acreage was planted this season.

Seed-cotton is now giving a much better percentage of lint, owing I think, in some measure to the adoption of the recommendations as to the sunning, bagging, etc., of the seed-cotton before being sent to the factory.

Six estates gave the following percentages of lint to seed-cotton, respectively: 29.9, 29.2, 29.1, 27.8, 27.62, 27.1.

COTTON IN TOBAGO.

The following notes on cotton in Tobago have been received from the Curator of the Botanic Station in that island:—

Several small holders of land in this island planted Sea Island cotton, and are just now reaping the crop. Some of the samples are of good quality, and there appears to be no reason why cotton should not be grown in Tobago, with as good results as in years gone by. Sometime ago, the British Cotton-growing Association sent out machinery for cleaning and baling cotton, but as the cultivation was taken up by only a few persons at that time, the machinery was not erected. It is hoped that the interest in cotton growing will be sufficient to warrant the erection of the ginning and baling machinery. The knowledge that opportunities are at hand for ginning and baling the cotton, when it is grown, would serve to encourage the industry.

COTTON IN THE LEEWARD ISLANDS.

The following reference to the cotton industry in the Leeward Islands appears in the *Textile Mercury* of January 20, 1906:—

The Acting Governor of the Leeward Islands reports that cotton growing is making fair headway in the islands. In 1903-4 cotton was grown in a tentative manner over a considerable area, while in St. Kitt's and Montserrat the

cultivation was conducted on a somewhat large scale. The results were variable, but such as to lead to a considerable extension of the industry, so that in the latter part of 1904 it was estimated that the following acreage was under cultivation in Sea Island cotton: Antigua and Barbuda, 500 acres; St. Kitt's, 1,000 acres; Nevis, 1,050 acres; Anguilla, 300 acres; Montserrat, 500 acres. Future developments will largely depend upon the prices realized. The Acting Governor says that the Imperial Department of Agriculture has been at great pains to afford assistance in every branch of the industry, providing seed, assisting to combat pests and diseases, and affording information and advice at every stage.

NOTES ON COTTON SEED AND LINT.

The character of the lint reaped depends to a great extent on the seed planted. This has frequently been pointed out in the *Agricultural News*. Now that the seed is being procured for next season's planting, it is of importance that the planters should be most careful to obtain seed which is known to have been produced by plants that have given the finest quality of lint. Those who are anxious to use their own seed may send samples of seed-cotton to the officer of the Department in their own island, who will forward them to the Head Office, where they will be examined, and a report prepared as to their respective merits. A note on the selection of cotton seed, which appears on p. 54 of this volume, gives further information on this point.

In the crop now being reaped, seeds are found which are undesirable for planting purposes. They are clean and black, without any indication of fuzz at either end. These particular seeds produce only a small quantity of lint at the apex, which makes the proportion of lint to seed very low. The proportion of weak fibre, on the other hand, is exceptionally high. Before planting is commenced, these seeds should be picked out, and only seed with a green fuzz at one or both ends should be used.

The lint on different parts of the seed varies in quality. At the apex of each seed, there is a bunch of very weak fibres which are only one-third the strength of those from other parts of the seed. The proportion of these is very variable; neglected fields, and those with heavy soil, producing more than others. The individual plants in the same field vary considerably.

Drying Sea Island Cotton. Planters are again reminded that quality in Sea Island cotton is all important, and that in preparing it for the market the greatest care should be exercised. It must be properly dried, or it will become matted when pressed in the bale, and in this condition will not bring so good a price as when it is more carefully prepared. The loss may be as much as 2d. per lb., which is of such importance as should induce planters to make every effort to put their cotton on the market thoroughly dried.

A Barbados planter, who kept his old cotton last year until the new crop had been planted, is now advocating a closed season when there shall be no cotton plants growing in the island, so that it will not be possible for old plants to be kept from one season to another.

The results obtained in the various islands show that it is not advisable to grow any other crop along with the cotton. Some planters have tried Indian corn and potatoes between the cotton rows but the results are not favourable to this practice.

EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming, should be addressed to the Commissioner, Imperial Department of Agriculture, Barbados.

All applications for copies of the 'Agricultural News' should be addressed to the Agents, and not to the Department.

Local Agents: Messrs. Bowen & Sons, Bridgetown, Barbados. *London Agents:* Messrs. Dulau & Co., 37, Soho Square, W., and The West India Committee, 15, Seething Lane, E.C. A complete list of Agents will be found on page 3 of the cover.

The *Agricultural News*: Price 1d. per number, post free 1½d. Annual subscription payable to Agents, 2s. 2d. Post free, 3s. 3d.

Agricultural News

VOL. V. SATURDAY, MARCH 3, 1906. No. 101.

NOTES AND COMMENTS.

Contents of Present Issue.

The editorial in this issue deals with the West Indian cotton industry, and gives figures showing the amount and value of cotton exported during 1905.

The notes on the sugar industry include an interesting account of West Indian seedling canes in Louisiana, and notes on new sugar-making machinery for the West Indies.

An interesting account of the cottagers' show at Carriacou will be found on p. 69.

On p. 70 will be found cotton notes, which include an article on the cost of labour in cotton production, and reports on the Sea Island cotton market.

The report of the Dominica Agricultural Society on p. 74 indicates that the planters of Dominica are making every effort to put Dominica fruit on the market in the best possible condition.

On p. 75 the article on Vegetable Butters, begun in the last issue, is concluded.

The note on p. 75 on the Purification of Water should be of interest and value to residents in many localities in the tropics.

The article on Training in Agriculture on p. 78 outlines a scheme which might be found useful in dealing with the loafing element of a tropical population.

The Agricultural News.

The title-page and index to the fourth volume of the *Agricultural News* was issued as a supplement to the last number (February 17).

Permanent Exhibition Committees.

The subject of Permanent Exhibition Committees was dealt with in the editorial in a recent number of the *Agricultural News* (Vol. V, no. 97). In that article, it was stated that the appointment of such committees had been frequently urged in the *West India Committee Circular*, and that it had received the cordial support of the Imperial Department of Agriculture.

According to a notice in the Barbados *Official Gazette*, the following gentlemen have been appointed to form a Permanent Exhibition Committee for Barbados: The Hon. F. J. Clarke, M.C.P. (Chairman); the Hon. F. M. Alleyne, M.L.C., Mr. V. Hänschell, Chairman of the Chamber of Commerce, Mr. Elliot Sealy, M.C.P., Mr. C. J. Greenidge, M.C.P., Mr. S. S. Robinson, M.C.P., Mr. J. R. Bovell, F.L.S., F.C.S., Mr. F. A. C. Collymore, Mr. G. Sebert Evelyn, and Mr. E. L. Hollinsed.

A Permanent Exhibition Committee has also been appointed at St. Lucia with his Honour E. C. Bennett as Chairman. The list containing the names of the members of this committee will be published later.

Bermuda Produce Inspection Committee.

In July 1905, the Officer administering the Government of Bermuda appointed a commission to ascertain what amendments should be made in the Produce Inspection Act, 1890, and to inquire into and report upon the causes of trade depression in those islands during the crop season of 1904-5, and to suggest remedies for the same.

The report of this commission, issued recently, gives the following as some of the opinions arrived at.

Dealing with the first subject of investigation—the amendments to be made in the Produce Inspection Act, 1890—the commission prepared and presented a draft bill, embodying their recommendations in legislative form.

The depression in agricultural industries is stated to have been due to the following causes: Over-production; the holding back of the crop in the hopes that prices would rise later on in the season; the lateness of the crop; competition of Texan and Egyptian onions in the New York market; and the condition in which a large part of the produce, particularly onions, was allowed to be shipped.

The remedy suggested deals with the last-named cause of depression—the quality of onions and potatoes shipped. To deal effectively with this, it is stated that legislation of an effective character would prove not only advantageous, but essential.

The other causes of depression cannot be dealt with by legislation. They are matters which, with the exception of that due to the lateness of the crop, could be remedied only by co-operation and combination on the part of the growers and shippers.

Pamphlet Series No. 38.

The following remarks relative to pamphlet No. 38 entitled 'The Cultivation and Curing of Tobacco' appeared in *Tropical Life* for January last:—'We congratulate the Imperial Department of Agriculture at Barbados on this the latest addition to the useful list of publications that they have issued for the guidance of tropical agriculturists. We have always been great believers in the possibilities that the West Indies offer as a tobacco-producing centre, and so gladly welcome anything that tends to encourage the industry. . . . We would recommend every small proprietor, if no one else, to secure a copy of this book, which costs only 4d. The chapter on shade-grown tobacco, showing how to produce, in Jamaica, the expensive wrapper tobacco imported from Sumatra, is alone worth the money. With such a book to start on, those owning an acre or so of suitable land should be able to do well, once they have mastered the different methods of handling and curing the plants.'

Determination of Sucrose.

In a letter to the Imperial Commissioner of Agriculture, the Hon. Francis Watts, C.M.G., D.Sc., states that the paper on the 'Polarimetric Determination of Sucrose' by himself and Mr. Tempany, published in the *West Indian Bulletin* (Vol. VI, p. 52) was reprinted in the *International Sugar Journal* for August last. Dr. Watts draws attention to the fact that it has given rise to interesting papers and criticisms in the issues of the latter journal for September, November, and December, and that, in the January issue, the editor gives a resumé of the whole position.

In his paper, Dr. Watts reviews the various methods in use for determining the percentage of sucrose in solution, and points out the many errors likely to enter into the calculations, and the ways in which these errors may be eliminated. In conclusion, Dr. Watts recommends the following method of working as generally applicable:—

- (1) 'Use a weight of 26 grammes of the sample of sugar, dissolve in distilled water and make up to 100 true cubic centimetres.
- (2) 'Clarify by means of anhydrous basic lead acetate, avoiding excess.
- (3) 'Polarize at the temperature at which the solution is prepared and correct for temperature by the formula, Polarization + $*(0.0038 t)$ N, where t is the difference between the temperature of observation and that at which the instrument was standardized, and N is the Ventzke scale reading.'

Working in this manner will, it is believed, secure a high degree of accuracy, and at the same time uniformity between those working under diverse climatic conditions. This method is therefore commended to the careful consideration of those responsible for securing uniform methods of sugar analysis, whether for official or technical purposes.

* If the temperature is below that of standardization, the correction will be - instead of +.

Tillage and Soil Moisture.

A successful planter in Barbados has observed that young cane plants have a much fresher appearance during dry weather if the surface layer of the soil is kept well tilled. He is now adopting the same principle in his cotton fields, employing the third-class gang to loosen the surface layer with scrapers sufficiently large for that purpose, but not large enough to damage the roots.

Frequent cultivation of the soil during dry weather is recognized as the best means of conserving soil moisture in ordinary field cultivations, and this planter has worked out for himself a principle on which much emphasis has been placed in recent years. A layer of fine tilth on the surface of the soil acts as a mulch to prevent rapid evaporation. The capillary action of the soil is checked by this layer of fine material, and the surface roots have a tendency to keep below it.

Suggestions for a Rubber Exhibition.

In *Tropical Life* for January 1906, it is suggested that a rubber exhibition similar to the cotton exhibition recently held at the Imperial Institute, would be appreciated, and might lead to the most unlooked-for development in this latest of tropical industries. The following suggestions are made:—

In order to ascertain what plants belong to the rubber family, and what are outside its group, planters and scientific men should send in specimens of all the known varieties of rubber-producing plants, and also, when possible, of samples of the cured latex. There might also be exhibited oils prepared from rubber seed, since inquiries are constantly being made as to their possible uses and value.

Next, in order to learn the best way to obtain the largest amount of milk from the plant with the least permanent damage to the tree, tapping tools of different kinds should be exhibited, and their relative merits and disadvantages discussed. Drawings, and, if possible, specimens and sections of trees showing the many ways of tapping, should also be on view.

Lectures by competent authorities on all phases of rubber cultivation would be very useful to men inclined to take up rubber planting as an investment.

With the following remarks the writer concludes his interesting article:—

'Such an exhibition cannot, however, be arranged without the spending of a considerable sum of money. Since there is no British Rubber Planting Association, although perhaps some day there may be one, we must look to Chartered Companies, the South American Republics, and other concerns, who have for sale lands suitable for rubber planting, to join in the venture. We must look also to the large steamship owners who carry rubber freights, to the makers of estate tools, machinery, manures and other supplies whose trade would benefit immensely by the encouragement of this new industry, and of course, to the makers of manufactured rubber articles. By these means, and possibly with some help from other quarters, there ought to be but little trouble and delay in making the preliminary arrangements for such an exhibition.'



INSECT NOTES.

New Mosquitos from the West Indies.

In the *Journal of Economic Biology* (Vol. I, no. 1), reviewed on p. 77 of this issue, there is a paper, by F. V. Theobald, M.A., on 'New Culicidae from India, Africa, British Guiana, and Australia.'

Three species of British Guiana mosquitos mentioned in this paper, which were collected at New Amsterdam by Dr. Rowland, are described as new.

The *Canadian Entomologist* (Vol. XXXVII, no. 12) for December 1905, contains a paper 'Notes on some Jamaica Culicidae' by M. Grabham, M.A., M.B. These notes, which are accompanied by good drawings, describe two new species and, in addition, give life-history notes and details of structure of several other species.

In the February number of the *Canadian Entomologist*, Mr. D. W. Coquillett presents a paper entitled 'Five New Culicidae from the West Indies.'

The specimens from which two of these species are described were collected in San Domingo by Mr. August Busck, who spent some time last year in the West Indies collecting mosquitos, and three new species are described from specimens collected in Trinidad, by Mr. F. W. Urich.

The names of the new species mentioned in these notes are as follows:—

British Guiana: *Gnophodeomyia inornata*, *Culex similis*, and *Pseudouranotaenia rowlandii*.

Jamaica: *Culex microsquamosus*, *Janthinosoma Johnstonii*.

Trinidad: *Melanoconion Urichii*, *Verrallina insolita*, and *Taeniorhynchus palliatus*.

San Domingo: *Stegomyia mediovittata*, *Stegomyia Busckii*.

Scale Insects from Antigua.

The Hon. F. Watts, C.M.G., D.Sc., has forwarded to the Imperial Department of Agriculture, some orange leaves infested by scale insects stating that they seem to be new.

Examination of these leaves shows that immature specimens of one of the Shield scales (*Lecanium* sp.) are present in small numbers. This is probably *Lecanium hesperidum*, which is known to occur in Antigua and other West Indian Islands on orange, lime, and a variety of other plants. There appeared also, on the same leaves, a small white fly (*Aleyrodes* sp.). This was in small numbers, and only the empty puparia were found. These are black with very few, short, wax filaments, and are probably the white fly of the orange *Aleyrodes citri*, an insect of very wide distribution.

Scale Insect from Barbados.

Mr. J. R. Bovell, F.L.S., F.C.S., in forwarding specimens to the office of the Imperial Department of Agriculture, writes: 'I am sending, herewith, two leaves taken from what appears to be a nutmeg plant, which was imported from Trinidad, and fumigated to-day at the Govern-

ment fumigatorium.' Mr. Bovell asks to be informed what the scales are that appear on the leaves. Upon examination, it was found that the leaves were infested with the mealy shield scale (*Protopulvinaria pyriformis*), a pest which is commonly found on nutmeg and many other plants, and which has a very general distribution in the West Indies.

Insects from Grenada.

Mr. R. D. Anstead, B.A., Agricultural Superintendent, Grenada, recently forwarded to the Imperial Commissioner of Agriculture a few interesting specimens of insects which he found at the Botanic Station. One of these, a small white moth, is reported to attack Ramie, rolling up the leaves, and feeding inside the shelter thus obtained. Another was a large beetle, the larva of which probably feeds on decaying wood. The specimen sent was found on an old tree stump.

A large wasp, of the family Sphecidae, was also among the number. This is a very large specimen, and black in colour. Insects of this family have the habit of storing their nests with insects for the young to feed upon, and are generally considered useful on that account.

Two very handsome metallic green beetles, of the family Buprestidae, were also among the specimens sent. The larvae of this family are known as the flat-headed borers, and are generally quite injurious. The adults, however, are among the handsomest of tropical beetles, some of the larger forms being mounted in gold settings for brooches, etc.

DOMINICA AGRICULTURAL SOCIETY.

Mr. Geoffrey Downing, the Hon. Secretary of the Dominica Agricultural Society, has forwarded to the Imperial Commissioner of Agriculture the following report of a meeting of the society held on February 10, 1906:—

The Vice-President opened the proceedings by referring to correspondence which was taking place with the Quebec Steamship Company, and proceeded to read a letter addressed to Messrs. A. E. Outerbridge & Co., the New York agents for the Quebec line, concerning the carriage of fruit from this island in their vessels.

In this letter it is suggested that Messrs. Outerbridge should authorize gentlemen specially appointed by the Agricultural Society, to inspect the accommodation for and storage of green limes on their vessels during the coming shipping season, as a means of ensuring proper treatment in transit.

Correspondence between Dr. H. A. Alford Nicholls and the Superintendent of the Royal Mail Steam Packet Company at Barbados then occupied the attention of the meeting. In this it was pointed out that under the new arrangement, oranges shipped to England in the R.M.S.P. Company's vessels, via Trinidad, arrived in London in a rotten and perfectly worthless condition. Captain Owen agreed that, under existing arrangements, he did not believe fruit could be carried satisfactorily, but suggested as an alternative, that the 'Yare' might be availed of to carry the fruit from this island direct to Barbados, to connect there with the ocean boat. The meeting requested the Vice-President to approach the local Government on the subject.

The election of Officers and Council for the current year resulted as follows: President, Dr. H. A. Alford Nicholls, C.M.G.; Vice-President, A. C. Shillingford, Esq., J. P.; Hon. Treasurer, E. A. Agar, Esq.; Hon. Secretary, G. G. Downing, Esq.; Members of the Council—Messrs. J. Jones, F. Potter, A. K. Agar, H. A. Frampton, A. J. Brooks, and Hon. J. Cox Fillan, M.L.C.

VEGETABLE BUTTERS.

(Concluded from p. 59.)

To turn, now, to the other class of vegetable butters—those made from nuts. The deodorised cocoa-nut oil or vegetable butter, as it is so often called, being unemulsified fat, or solidified oil, and tasteless, cannot be used on bread in place of dairy butter, and although the claim is made that it is nutritious, it is scarcely to be regarded either as a true butter, or possessing much nutritive power. But the butters made from nuts are in reality true butters and very nutritious. They possess also—unlike the deodorised cocoa-nut oil—distinctive flavours, and are valuable additions to bread and other foods. These nut butters can be spread upon bread and eaten. They are now becoming largely used, especially by the stricter class of vegetarians, who object to animal matter in any form. These nut butters can be formed into a kind of milk and cream by mixing up with water, and used in tea, coffee, puddings, etc. I think these nut butters well worthy the attention of the profession, and should be more frequently recommended by chemists to be used in place of ordinary dairy butter. They are superior to the latter in many ways. Thus, nut butters, being vegetable compounds, keep fresh and pure very much longer than animal butters; but as they contain the moisture natural to all nuts, they will not keep indefinitely, and should be made with strict care from good sound nuts only, and stored in lever-lid tins nearly full. The usual sizes sold contain $\frac{1}{2}$ lb. or 1 lb., prices varying from 9d. to 1s. 6d. per lb. I would here advise those who live in large towns, and have a difficulty in getting really pure and fresh dairy butter, to give these valuable nut butters a trial. They are guaranteed free from chemical preservatives, and well worthy of a trial.

Butter made from sweet almonds is the daintiest and is usually most liked; that from walnuts is also excellent. Pea-nut butter has a coarse flavour, and is used more in baking bread, and in sauces to pour over cooked vegetables. It is not eaten on bread like the almond or walnut butter. Cocoa-nut butter is also a dainty article, but more used in cakes and biscuit. These butters may be prepared on a small scale by blanching the nuts, and grinding to a smooth consistency through some of the small mincing machines now so much used, such as 'The General Cutter,' made by Messrs. Spong & Co., Holborn, London; or 'The Magic Food Chopper,' made by Messrs. Follows and Bates, Gorton, Manchester, and sold at 5s. 6d. each. These are very useful little machines for many purposes, apart from kitchen requirements, and as there are four different-sized cutting plates with each machine, they grind or cut up a variety of things, such as senna leaves which are easily ground after being previously dried. To make the nut butters, pass the nuts through one of the larger cutting plates in the machine, and then through the small-sized cutting holes. There is also a small mill made by Messrs. Mather & Co., engineers, Wellingborough, and sold at about £4, which would give good results. It can be worked by hand or power, and is an excellent small mill for levigating ointments and paints, and for many other uses. The various nut butters, however, may be purchased ready put up for sale. Mr. Hugh Mapleton, Ardwich, Manchester, makes some very fine kinds. They can also be obtained from the London Nut Food Company, Battersea Park, S.W., or the International Health Association, Legge Street, Birmingham. The Pitman Stores, health food specialists, Birmingham, also supply these and many other specialties.

I would advise chemists to stock and recommend

various health foods more than they do at present, and to write to the firms named above for a copy of their illustrated price lists.

THE PURIFICATION OF WATER.

The following note on the purification of water, taken from the *Demerara Argosy*, of January 20, 1906, might prove of interest and value in those places where there is a difficulty in securing and maintaining a supply of pure water:—

The purification of water is a problem to which a good deal of attention has been given here, but still we are face to face with the fact that our main supplies—apart from rain water—are more or less polluted. It is interesting to learn that copper sulphate, which, when used for preserving vegetables, is generally condemned, has remarkable properties in purifying water. This discovery was made some time ago by Dr. Moore, of the Agricultural Department of the United States Government, who found that, when employed in minute quantities, it will destroy algae and other impurities which give to water a stale and fishy odour, and also kill a large percentage of harmful bacteria. A description is given in *Water* by Dr. J. Howard-Jones, Medical Officer of Health for Newport (Mon.), of the first application of copper sulphate in England for purifying water. The experiment was made in three reservoirs supplying that town. The treatment followed closely on the lines found successful in America. First the Ynis-y-fro reservoir, containing 81,000,000 gallons of water, was dealt with. The plan adopted was to tie bags, each containing 28 lb. of copper sulphate, five at a time, from the edge of a raft, which was towed over the whole surface of the reservoir. As the copper sulphate disappeared in solution new bags were tied on. In all, twenty-eight bags of this weight were used. The results were entirely satisfactory. Within twenty-four hours there was a marked improvement in the water, both on the surface and at a depth of 10 feet, when examined in a 2-foot tube. In a few days the water was brilliantly clear, and the staff reported they had never seen the reservoir look so well. Samples of water were taken at various depths during the days following the treatment, with the result that in less than a week, the water was again delivered to the public, free from any appreciable traces of cupric sulphate.

THE VALUE OF THE SHARK.

In the January issue of the *Journal of the Society of Arts* the following interesting facts are embodied in the report of the acting Commissioner of Somaliland. Writing on the subject of the shark fishery off the coast of Berbera, he says that ten to fifteen dhows from the Arabian coast visit the fishery during the season; that about 1,000 sharks are caught, averaging 4 feet to 5 feet in length. Of the five Squalidae known to the natives, the two-horned or hammer-headed shark is the commonest catch. The quantity of liver oil obtained from six fish is 5 gallons. This is extracted by boiling, and the thick liquid is purified by straining through matting. The price per tin of 4 gallons, purchased direct from the fishermen, is 1 rupee 4 annas; purchased, however, in the town only a mile distant from the spit where the crude manufacture is carried out, the cost is 3 rupees to 3½ rupees (about 4s. 8d.), although there is no expense at all on its transit. The oil is used for caulking country craft.

The body of the shark after being salted and dried in the sun, is sold in the bazaars, the fins and the tail being considered the most succulent parts. The spine and the jaw, if the latter is large, are vended as curios at Aden.



GLEANINGS.

It is proposed, says the *International Sugar Journal* for January 1906, to establish a sugar market at Havre which would facilitate sugar exports to England.

The same journal has the following note on p. 43: 'The year 1904-5 has been a memorable one in the history of British Guiana, in that its sugar crop was reaped and sold for the first time free from the unfair competition of bounty-fed beet sugar.'

In the *Cotton Trade Journal* of January 20, 1906, the Manchester correspondent of that newspaper states: 'Some excellent cotton has been received from Barbados and other West Indian Islands, and if the quality can be maintained, this may develop into an important source of supply.'

Under the head of agriculture, in the *St. Lucia Blue-book* for 1904, it is stated that there are now three fairly large apiaries producing, chiefly, extracted honey, besides small ones of three or four hives each. The cultivation of cacao continues to be extended and improved, but that of cotton is only in the experimental stage.

It is stated in the *Textile Mercury* of January 27, 1906, that a meeting of the North Carolina section of the Southern Cotton Association was recently held at Raleigh, when it was decided to make every effort to keep the acreage of cotton planted in North Carolina during 1906 down to that of the crop of 1905. It was also advised to build more warehouses for the storage of cotton.

The *Annual Report* on British Guiana for the year 1904-5 contains the following in regard to plantains and bananas: '17,720 acres are occupied by these crops, practically the whole production being consumed locally. As good bananas can be grown in British Guiana as in any other part of the world, and if some strong organizing spirit could be found to deal with the question of freight, there seems to be no reason whatever why the colony should not occupy a leading position in the supply of this commodity.'

The Government of Brazil has decreed a prize of \$30,000 (£2,125) for anyone who exhibits 100,000 Manicoba rubber trees (*Hancornia speciosa*) within eighteen months from December, the date of the announcement; and three other prizes of \$15,000 (£1,062), \$10,000 (£708), and \$5,000 (£354), respectively, for the three next largest plantations, the smallest of which, in order to gain a prize, must not be of less than 10,000 trees. It appears that, not to speak of the value of the rubber, the coffee trees benefit greatly by the shade afforded by the rubber trees. (*West India Committee Circular*, January 19, 1906.)

In the last issue of the *West India Committee Circular* a fine illustration is given of the cane rakes in use at the Usine St. Madeleine, Trinidad. As nearly as we can judge from the cut, this is a rake of the Bodley-Mallon type which has been so successful generally in Louisiana and in some of the British West Indies. (*Louisiana Planter and Sugar Manufacturer*, January 20, 1906.)

Over 5,140 acres are returned as being occupied by cocoa-nut palms. The export of cocoa-nuts amounted to 581,334 nuts, valued at £1,728, as compared with 46,829 nuts, valued at £131 in the previous year. The impetus lately given to the planting of cocoa-nuts is still working, and a considerable extension of the area under cultivation may be looked for in the near future. (*Annual Report on British Guiana*, 1904-5.)

A photograph of the white variety of *Petrea volubilis* appears in the *Gardeners' Chronicle* for January 13 last. The photograph was taken in the garden of Newcastle plantation, Barbados, and shows the 'White Wreath' as a most attractive and beautiful object. There also appears in the same periodical an illustration of the purple form of this *Petrea* from a specimen grown in the garden of Sir Trevor Lawrence, Bart., at Dorking, Surrey.

In an interesting paper read before the Paris Academy of Sciences, M. Gaston describes some experiments that have been carried out in an endeavour to discover the relations between bees and colour. The author's experiments show that bees are not influenced by colour in their search for honey, and the contradictory experiments of previous observers are said to be due to a lack of knowledge of the habits of bees.

In the West Indies, says a Press Association telegram from Barbados, considerable interest is being shown by cotton planters in the ratooning question, as it has begun to be felt that in the long run ratooning must eventually have a detrimental effect on the quality and, consequently, on the relative value of the product, and as it is to the advantage of the island generally that only the very best cotton should be grown and shipped, every effort will be made to bring about a cessation of the practice. (*Textile Mercury*, January 27, 1906.)

A Jamaica correspondent states that arrangements are being made for the establishment, near Port Maria, of a banana fibre factory. It appears that a company has been formed at Boston, U.S.A., to manufacture paper and rope from the fibre, and experiments conducted in America are said to have shown that rope equal to the best manila, and paper of excellent quality, can be made cheaply from this hitherto neglected by-product of the fruit industry. A banana fibre rope, 1 mile in length, tested at the United States Navy Yard, was found superior to manila rope in tensile strength. (*Textile Mercury*, February 3, 1906.)

The following appears as a 'Colonial Note' in the *Gardeners' Chronicle* for January 13, last: 'Mr. W. E. Broadway, the late Curator of the Botanic Station in Grenada, has started a large nursery of economic and ornamental plants, and is prepared to accept orders for strong, healthy plants to be delivered early in 1906. Among his list of economic plants we note the grafted Ceylon mango, which is generally recognized as the best of the imported mangos. We hope Mr. Broadway will be successful in his venture.'



THE JOURNAL OF ECONOMIC BIOLOGY.

Edited by W. E. Collinge, M.Sc., Lecturer on Zoology and Comparative Anatomy in the University of Birmingham, London, Messrs. Dulau & Co. Annual subscription 16s.:—

The first number of this new periodical has just been published. Four numbers are to appear every year to form a volume. It is edited by Mr. W. E. Collinge, M.Sc., in co-operation with Professor A. H. Reginald Buller, D.Sc., Professor George H. Carpenter, B.Sc., Mr. Robert Newstead, A.L.S., and Mr. A. E. Shipley, F.R.S., and should prove a great success.

In the editorial notice, it is pointed out that workers in economic biology in the United Kingdom and elsewhere have found great difficulty in obtaining the publication of their papers. It is expected that this journal will offer a medium for the publication of such papers.

This number contains articles on the following subjects: The Destruction of Wooden Paving Blocks by the fungus *Lentinus lepidens*, Fr., by Professor Buller, D.Sc.; The Effect of Change of Food and Temperature on *Abraxas grossulariata*, Steph., by Mr. W. E. Collinge, M.Sc.; and New Culicidae from India, British Guiana, etc., by Mr. F. V. Theobald, M.A.

Towards the end of this number reviews are given of new books, and a list of the current literature dealing with biological subjects of economic importance. The editor states that in future numbers it is hoped to offer critical abstracts from the current literature. A hope is also expressed that all economic biologists will soon find it indispensable, and will assist in making its publication a success.

BARBADOS FISHERIES.

The following is taken from the Report of the special Committee appointed to consider and report upon the Fishing Industries of the island, which appeared in the Barbados *Official Gazette*, of February 1:—

After holding several meetings and taking the evidence of persons conversant with the various fishing industries carried out round the coasts of this island, the Committee are of opinion that there has been for some time past a serious diminution in the quantity of the catches of sea-eggs, turtles, sea-crabs, lobsters, and of the fish usually caught in fish-pots, and that unless some legislative action be taken in the matter, a considerable amount of suffering will ensue to the fishermen and some of the poorer classes of the island, who live mainly on the fish caught along the coast.

To remedy the existing evils, and to check this alarming diminution in the quantity of fish now going on, the Committee recommend:—

1. (a) That instead of a close season for sea-eggs there should be established one or more properly policed sanctuaries within which it should be unlawful to take sea-eggs, one of such sanctuaries to be an area bounded by the coast line extending from 'Woman's Bay' to 'Long Bay' in the

parish of Christ Church, and by a line parallel thereto $\frac{1}{2}$ mile or more out to sea.

(b) That the Act establishing such sanctuaries should contain a provision forfeiting all boats, vessels, receptacles, etc. used in the capture or taking of sea-eggs within such prohibited area. Or, if it be found impracticable to carry out the foregoing recommendation, that there should be a close season for sea-eggs from the first day of January to the thirtieth day of September (both days inclusive) in each year.

2. That the taking of turtles and their eggs should cease for a period of two years, and that half of the penalty imposed for a breach of the law should go to the informer.

3. That the meshes of fish-pots should be regulated by statute and that the size of the meshes should not be smaller than 2 inches.

4. That it be made an offence to catch sea-crabs and lobsters while spawning.

5. That the dynamiting of fish be punishable by imprisonment. The Committee further recommend that all the Acts relating to fishing, including the catching of whales and sea-eggs, should be consolidated into one Act embodying the above recommendations.

These recommendations are based on the report of the majority. One member objects to a close season for sea-eggs on the ground that a close season stimulates the trade in this article, and thus induces larger catches at certain times, notably the first few weeks of the open season, and he believes that if the catches were uniform for all parts of the year there would be no cause to worry over the future of the industry. The same member does not believe that a law for the protection of the turtle would prevent a fisherman from capturing such a valuable prize if he got the chance, and consequently, he is not in favour of passing such a law.

SCIENCE NOTES.

Flowering of Bamboos.

Several articles have recently appeared dealing with the flowering of bamboos, and the fatal effect on the plants themselves of the flowering process. A majority of the species mentioned in this connexion are the Chinese and Japanese hardy kinds. That tropical species are liable to the same peculiar fate, is shown by the following paragraph taken from a brief article entitled 'The Riddle of the Bamboos' by the Right Hon. Sir Herbert E. Maxwell, Bart, M.P., in the *Scottish Review* of December 21, 1905:—

This suicidal habit of most bamboos has been recorded by many botanists and travellers during the last hundred years. Whole forests of certain species have been known to disappear in India in a single season, to the manifest inconvenience of the natives who rely on the great canes for housebuilding and many other purposes. Many kinds of trees and plants flower individually, only at long intervals; others, annuals and biennials, flower but once and die. But the periodicity of bamboos, apparently about thirty-three years, is independent of their age. Old plants and young, lofty and lowly, all obey the inscrutable mandate at the same moment, and, having complied therewith, perish. Attempts have been made, with partial success in a few cases, to save their lives by cutting down the culms, as soon as they showed signs of flowering. In most instances the plant has resisted this, pushing up new culms in haste, and putting out new flowers, thereby incurring the death penalty.



TRAINING IN AGRICULTURE.

In an editorial on this subject, the *Port-of-Spain Gazette*, in its issue of January 21 last, urged on the Government of Trinidad the duty of further pressing the cause of agricultural education in the island, and of relieving the town of Port-of-Spain of its large number of able-bodied loafers.

It is not, says the *Gazette*, that the reason for this state of unemployment is due to the absence of any demand for the labour of these men, but rather that the men will not meet the demand. They prefer to idle in the town to working in the fields. And not only does this state of affairs refer to the town, but to the country districts as well. Work can be had, and had in abundance, if only the need for more agricultural labour be recognized, and insisted upon. Let the work of these men be secured for the estates, and the planter's grievance as to the shortness of the supply will be removed.

But is such a scheme practicable? That is the question. The *Gazette* answers it by echoing the suggestion made by the *Demerara Daily Chronicle* at the time of the recent riots in that colony—that some scheme of forced labour, such as is to be met with in Switzerland, should be adopted. What that plan is, the following extract will explain:—

'If an able-bodied man be without means and is genuinely out of work, he is supplied by the police or by the Inter-Cantonal Union with food and lodging and will have work, or where to get it, indicated to him. If he does not take advantage of the opportunity for honest employment under ordinary circumstances, or if he prove, in the expressive phrase, a work-shy, he may be sent for a term varying from three months to two years to a forced labour institution. A forced labour farm has been in existence at Witzwyl since 1895. The site was a piece of waste land 2,000 acres in extent, consisting mainly of water-logged soil subject to inundations. Extensive works of reclamation have been carried out, with the result that about two-thirds are already in beneficial occupation bearing considerable crops. There is accommodation on the farm for 200 hands, but seldom are there more than 150 able-bodied men employed at one time. All inmates on their first entry are set to work on the farm, and after some experience, they are retained there, or sent to some other occupation in connexion with the farm. Work commences at 5.30 a.m., and concludes at 7 p.m., and substantial rations are provided. In addition to agriculture, there are workshops for tailoring, shoemaking, smith's work, and carpentering, but only men brought up to those trades are allowed to work at them, agriculture being the mainstay. A Chaplain makes weekly visits, and the Inspector of Prisons interviews each prisoner previous to his discharge. In the winter evenings, there is a school for any who may volunteer to attend, and on Sunday after service, singing is allowed. Satisfactory conduct entitles a prisoner to a remission of part of his sentence, and hard honest work enables a man to obtain a bonus, which he receives on his discharge. The report of Mr. H. Preston-Thomas, of the English Local Government Board, to which we are indebted for these facts, states that the guiding principle of the management is to "improve the land by man, and man by the land." The first of these objects, at any rate, is secured in a conspicuous degree. A huge marsh has been converted into a fertile farm, traversed by newly-constructed roads, and supplied with sufficient buildings. More and

more land has been reclaimed each year, and while the peat has been sold at satisfactory prices, the soil, by scientific treatment and the judicious use of chemical manures, has been made to produce abundant crops, the establishment being now actually self-supporting. Farm work affords the best opportunity for dealing with those in whom laziness has become ingrained, as they are placed in the middle of a gang of labourers, and have to exert themselves whether they like it or not.'

Some such scheme as this might be attempted, the details being worked out to suit local circumstances. The result would be two-fold. The gain would be lasting. In the first instance, large tracts of fertile, but hitherto uncultivated land, would be worked at a low cost, and the foundation laid for more general cultivation than at present. In the second instance, instead of the bands of idlers now to be seen in Trinidad's city and villages, there would grow up a class of really industrious and reliable workmen.

THE MAHUA TREE.

The *Louisiana Planter and Sugar Manufacturer* for January 27, 1906, contains an interesting report of a lecture on the Mahua tree (*Bassia latifolia*), delivered by Professor Voight before the Natural Science Society of Hamburg, Germany, from which the following is taken:—

The mahua, as a nut-bearing tree, has been known for many ages. In the laws of Manu, the priesthood of India are forbidden to indulge in 'madhvi,' a fiery liquor made from the fruit, and in the 'Collection of Indian Remedies,' by Susruta, we are told that the tree yields a sugary paste, from which a fermented drink is made.

It belongs to the star-apple family (Sapotaceae), the family to which belongs the very important gutta-percha tree of the Malay Archipelago, and is found only in the northern border of India, where it grows clear to the foot of the mighty Himalayas. It grows from 50 to 65 feet high, and is one of the few deciduous trees of that region. Its blooming period lasts from the end of February till April. Quickly after the pollen is formed, the whitish tubular flowers swell to balls about as large as a cherry, which contain a large amount of invert sugar (honey). The flower tubes fall, covering the ground in the greatest profusion. They are eagerly gathered by the natives and eaten. A tree yields from 250 to 300 lb. of flowers, which, when dry, weigh about half as much, and occupy about one-fourth as much space. The land is leased to the natives, and as the region where it grows is of a poor and stony soil, the tree constitutes an important source of food. The fruit is usually mixed with rice and thus eaten. The dried flowers have very much the taste and appearance of raisins. They are exported to Europe as a curiosity, and are also used as food for animals. Distillation yields a large percentage of spirits, which diluted with water makes 'dárú,' a native whisky very much used. It comes on the market in oaken barrels, and is highly esteemed by Europeans, who claim that it equals the best whisky. Almost every village has its distillery. In the island Carouge, just outside of Bombay, some 60,000 to 80,000 rupees (about £4,000 to £5,333) are invested in stills alone.

Besides the flowers, the seeds are of considerable use. They contain a fat of butter-like consistency, which serves as a foodstuff. It is called 'mowra,' and the crude stuff is known as 'illipi,' and is used by the Europeans largely for making candles, soaps, etc. The wood is very hard and lasting, and is much used for making the wheels of the native bullock carts.

WEST INDIAN PRODUCTS.

Jamaica Coffee.

In the *Jamaica Gleaner* for January 18 last, there is an account of an interesting lecture given to the members of the Christiana branch of the Agricultural Society of Jamaica by Mr. Robert Thomson, Instructor in Agriculture.

Speaking of coffee and its cultivation, Mr. Thomson says that for a long period of years coffee has been one of the important staple products of the island, and that it has contributed powerfully to the establishment of innumerable small settlers everywhere, and has been their main source of income:—

The finest quality of coffee can only be grown at great elevations above the sea in Jamaica, between 3,500 and 4,500 feet. This coffee is sold in England at about 120s. per cwt. Manchester grown coffee, that grown at about 2,000 feet on estates or plantations, is of good medium quality, and should be worth from 70s. to 80s. per cwt. But the Blue Mountain coffee holds a unique position in the market; it is the finest coffee in the world. The climatic conditions, and the soil, together with the admirable care devoted to its cultivation, and to its manipulation, have all conduced to the establishment of this renowned coffee. Thus, Jamaica produces the finest coffee in the world, together with another important grade of coffee, namely, that quality in greatest demand in commerce.

But, unfortunately, it also produces the very worst quality, and this in considerable quantity. It is planted by the small settlers anywhere, without discriminating in any way as to the congenial requirements of the plant. There are thousands of acres grown at only a few hundred feet above sea-level. The prices obtained for this inferior stuff range from 25s. to 32s. per cwt., barely more than one-third realized for that grown on plantations on the hills, where it can be grown to the extent of many thousands of acres.

For the production of a good marketable coffee the plant should never be cultivated under 1,200 to 1,500 feet in this latitude.

This planting of coffee at an inadequate altitude, and the consequent production of an inferior article, in Mr. Thomson's opinion, should be discouraged by every possible means. The small settlers, too, should not be so apathetic, but should be more alive to their interests by paying due attention to cultivation, picking, curing, and preparation for market. Coffee so tended, even if grown somewhat under 1,000 feet above sea-level, would be worth 50 per cent. more than the price of 30s. per cwt. now obtained.

The Canadian Market.

Writing to the Imperial Commissioner of Agriculture from Montreal on January 18 last, Mr. J. Russell Murray reports as follows:—

SUGAR.

A very steady but inactive market without any marked change has ruled for some weeks. In New York, a firmer market held for a week, but prices are again relapsing to

their former level. In Montreal, about 30,000 bags of 96° centrifugals were delivered during the past month, at rates about $2\frac{1}{3}$ c. c. & f., equalling \$2.66 duty paid. Grocery sugars, muscovados and centrifugals, are extremely quiet, lotting being confined to small lots.

Scotch refined sugar made from British West Indian sugar continues a large factor in the market. Local refiners lowered prices 10c. last week in sympathy with New York. Yellows were advanced 10c. in New York; no change, however, was made here. The combine of the Wholesale Grocers' Guild, of which the refiners and canners are a component part, are under prosecution by the Crown, owing to alleged limitations being placed on business by such combinations. The case will be before the courts at Toronto next week.

SUGAR TARIFF.

Nothing has transpired regarding the future from the sittings of the Commission, but it is remarkable that not a single effort has been put forth by the British West Indian Islands to support the representations made to the Commission for the admission of the better grades of grocery sugar to Canada on a better basis. By natural progress of manufacture, British West Indian sugars have steadily improved in colour and grain, and the consuming demand calls for a better class, but the tariff remains obsolete. This lack of action is causing comment.

MOLASSES.

Barbados molasses continue to be distributed in small lots: the trade, however, remains quiet. Stocks are not heavy, and buyers of new crop are expecting very low quotations.

COCOA-NUTS.

Manufacturing interests are steady, but there is little business otherwise. Prices remain very steady.

SPICES, ETC.

Pimento sales are slow and the advance in price is difficult to obtain locally, some holders allowing stocks to be distributed at the original figure. With regard to nutmegs, a small steady business is done, but there is no change in price. The new crop of ginger is being looked for, meanwhile the trade is dull.

CONSIGNMENTS OF SUGAR AND MOLASSES.

Shippers desirous of shipping on consignment during the present season will please advise early in order that sales may be made in advance of arrivals.

SHIPPING MANGOS.

In a note supplied to the *Journal of the Jamaica Agricultural Society* for January 1906, Mr. Aston W. Gardner gives wholesome advice on the subject of the picking and shipping of mangos. He says that the best variety for export is the East Indian. The fruit should be picked in full condition, as that picked too green never ripens. At least an inch of stem should be left on each mango to prevent it from bleeding.

In packing, each mango should be placed in a separate division. Speaking from his own experience, Mr. Gardner says that it is useless to ship mangos after July, and he hints that if shippers would personally superintend the selection and the packing of the fruit, they could command prices higher than those now given.

MARKET REPORTS.

London,—February 2, 1906. Messrs. KEARTON, PIPER & Co.; Messrs. E. A. DE PASS & Co.; 'THE WEST INDIA COMMITTEE CIRCULAR,'; 'THE LIVERPOOL COTTON ASSOCIATION WEEKLY CIRCULAR,'; and 'THE PUBLIC LEDGER,' January 27, 1906.

ALOE—Barbados, 15/- to 60/-; Curaçoa, 17/- to 75/- per cwt.
ARROWROOT—St. Vincent, 2d. per lb.
BALATA—Sheet, 1/4 to 1/11; block, 1/4 to 1/4½ per lb.
BEES'-WAX—£7 10s. to £7 12s. 6d. per cwt.
CACAO—Trinidad, 52/- to 60/- per cwt.; Grenada, 47/- to 51/- per cwt.
CARDAMOMS—Mysore, 7½d. to 3/- per lb.
COFFEE—Jamaica, good ordinary, 38/- to 40/- per cwt.
COTTON—West Indian; medium fine, 6·70d.; West Indian Sea Island, medium fine, 13d.; fine, 14d.; extra fine, 15½d. per lb.
FRUIT—
BANANAS—Jamaica, 5/- to 7/- per bunch.
GRAPE FRUIT—No quotations.
LIMES—No quotations.
ORANGES—Jamaica, 6/- to 8/- per box of 176-200.
FUSTIC—£3 5s. to £4 per ton.
GINGER—Jamaica, 45/- to 56/- per cwt.
HONEY—21/- to 25/- per cwt.
ISINGLASS—West Indian lump, 2/- to 2¼; cake, 1/3 to 1/4 per lb.
KOLA NUTS—4d. to 6d. per lb.
LIME JUICE—Raw, 11d. to 1/- per gallon; concentrated, £16 10s. per cask of 108 gallons; hand-pressed, 2/3 to 2/6 per lb. Distilled Oil, 1/4½ to 1/5 per lb.
LOGWOOD—£4 to £4 15s.; roots, £3 10s. to £4 per ton.
MACE—Good bold pale, 1/6 to 1/8; good red, 1/4; broken, 1/1 to 1/3 per lb.
NITRATE OF SODA—Agricultural, £11 5s. per ton.
NUTMEGS—65's, 1/2; 72's, 10d.; 80's, 9d.; 96's, 6½; 108's, 5¾d.; 135's, 5d. per lb.
PIMENTO—Fair, 2¾d. to 2¾d. per lb.
RUM—Demerara, 1/- per proof gallon; Jamaica, 2/1 per proof gallon.
SUGAR—Yellow crystals, 13/9 to 16/9 per cwt.; Muscovado, 15/- to 15/6 per cwt.; Molasses, 10/6 to 14/6 per cwt.
SULPHATE OF AMMONIA—£12 15s. per ton.

Montreal,—January 18, 1906.—Mr. J. RUSSELL MURRAY. (In bond quotations, c. & f.)

COCOA-NUTS—Jamaica, \$27·00 to \$29·00; Trinidad, \$25·00 to \$26·00 per M.
COFFEE—Jamaica, medium, 10c. to 11c. per lb.
GINGER—Jamaica, unbleached, 7½c. to 10c. per lb.
MOLASCUIT—Demerara, \$1·00 per 100 lb.
MOLASSES—Barbados, 29c. to 30c.; Antigua, 24c. per Imperial gallon.
NUTMEGS—Grenada, 110's, 18c. per lb.
ORANGES—No quotations.
PIMENTO—Jamaica, 5¼c. per lb.
SUGAR—Grey crystals, 96°, \$2·00 to \$2·15 per 100 lb.
—Muscovados, 89°, \$1·50 to \$1·65 per 100 lb.
—Molasses, 89°, \$1·35 to \$1·50 per 100 lb.
—Barbados, 89°, \$1·45 to \$1·70 per 100 lb.

New York,—February 2, 1906.—Messrs. GILLESPIE BROS. & Co.

CACAO—Caracas, 11½c. to 12½c.; Grenada, 10¼c. to 10¾c.; Trinidad, 11c. to 11½c.; Jamaica 9¾c. to 9¾c. per lb.
COCOA-NUTS—Jamaica, \$25·00 to \$26·00; Trinidad, \$23·00 to \$25·00 per M.
COFFEE—Jamaica ordinary, 8½c. to 8¾c.; good ordinary, 8¾c. to 9c.; washed 10¾c. per lb.
GINGER—Jamaica, 7¼c. to 9¾c. per lb.
GOAT SKINS—Barbados, Dominica, and Antigua, 58c. to 60c.; Jamaica, 61½c.; St. Kitt's, 51c. per lb.

GRAPE FRUIT—Jamaica, \$4·00 to \$7·00 per barrel; \$2·75 to \$3·50 per box.
MACE—28½c. to 32c. per lb.
NUTMEGS—West Indian, 80's, 22½c. 90's, 19c.; 100's, 17½c.; 110's, 14c.; 120's, 12c.; 130's, 10c. per lb.
ORANGES—Jamaica, \$4·00 to \$4·50 per barrel; \$2·00 to \$2·50 per box.
PIMENTO—4¾c. to 5c. per lb.
PINE-APPLES—No quotations.
SUGAR—Centrifugals, 96°, 3½c.; Muscovados, 89°, 3c. Molasses, 89°, 2¼c. per lb.

INTER-COLONIAL MARKETS.

Barbados,—February 24, 1906.—Messrs. T. S. GARRAWAY & Co., and Messrs. JAMES A. LYNCH & Co., February 20, 1906.

ARROWROOT—St. Vincent, \$3·80 to \$4·25 per 100 lb.
CACAO—\$9·00 to \$9·50 per 100 lb.
COCOA-NUTS—\$10·00 per M. for husked nuts.
COFFEE—\$10·50 to \$11·75 per 100 lb.
HAY—95c. to \$1·60 per 100 lb.
MANURES—Nitrate of soda, \$65·00; Ohlendorff's dissolved guano, \$55·00; Cotton manure, \$48·00; Sulphate of ammonia, \$75·00; Sulphate of potash, \$67·00 per ton.
MOLASSES—14c. per gallon.
ONIONS—Lisbon, \$3·00 per 100 lb.
POTATOS, ENGLISH—Nova Scotia, \$2·25 to \$2·50 per 160 lb.
RICE—Ballam, \$4·70 to \$5·25 per bag (190 lb.); Patna, \$2·86 to \$3·25; Rangoon, \$2·50 to \$2·75 per 100 lb.
SUGAR—Muscovados, 89°, \$1·30; Dark crystals, 96°, \$1·80 per 100 lb.

British Guiana,—February 14, 1906.—Messrs. WIETING & RICHTER.

ARROWROOT—St. Vincent, \$8·00 per barrel.
BALATA—Venezuela block, 25c.; Demerara sheet, 38c. per lb.
CACAO—Native, 13c. to 14c. per lb.
CASSAVA STARCH—\$4·00 per barrel.
COCOA-NUTS—\$10·00 to \$12·00 per M.
COFFEE—13¼c. to 13¾c. per lb.
DHAI—\$4·90 to \$5·00 per bag of 168 lb.
EDDOES—72c. to \$1·44 per barrel.
ONIONS—Lisbon, 3½c. per lb. (ex store).
PLANTAINS—12c. to 48c. per bunch.
POTATOS, ENGLISH—\$2·50 to \$2·60 per barrel.
POTATOS, SWEET—Barbados, \$1·32 per bag.
RICE—Ballam, \$4·50 to \$4·60 per 177 lb.; Creole, 64c. per bag (ex store).
SPLIT PEAS—\$5·80 per bag (210 lb.).
TANNIAS—\$1·92 per barrel.
YAMS—White, \$1·68; Buck, \$2·16 per bag.
SUGAR—Dark crystals, \$1·80 to \$1·90; Yellow, \$2·30 to \$2·40; White, \$3·20 to \$3·25; Molasses, \$1·70 to \$1·80 per 100 lb. (retail).
TIMBER—Greenheart, 32c. to 55c. per cubic foot.
WALLABA SHINGLES—\$3·00, \$3·75, and \$5·25 per M.

Trinidad,—February 16, 1906.—Messrs. GORDON, GRANT & Co.; and Messrs. EDGAR TRIPP & Co.

CACAO—Ordinary to good red, \$11·00 to \$11·25; estates, \$11·40 to \$11·60 per fanega (110 lb.); Venezuelan, \$11·65 to \$12·00 per fanega.
COCOA-NUTS—\$20·00 per M., f o. b.
COCOA-NUT OIL—70c. per Imperial gallon (casks included).
COPRA—\$3·10 to \$3·25 per 100 lb.
DHAI—\$4·00 to \$4·25 per 2-bushel bag.
MOLASSES—15c. per gallon.
ONIONS—\$2·00 to \$2·50 per 100 lb. (retail).
POTATOS, ENGLISH—\$1·40 to \$1·50 per 100 lb.
RICE—Yellow, \$4·50 to \$5·00; White, \$5·00 to \$5·90 per bag.
SPLIT PEAS—\$5·00 to \$5·25 per bag.
SUGAR—Yellow crystals, \$2·00 to \$2·25; molasses; \$1·50 to \$1·75 per 100 lb.



A FORTNIGHTLY REVIEW

OF THE

IMPERIAL DEPARTMENT OF AGRICULTURE FOR THE WEST INDIES.

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intend to enter upon a life work of agriculture in the capacity of overseers upon West Indian sugar and other plantations.

For this purpose, in 1899, a lecturer in Agricultural Science was provided by the Imperial Department of Agriculture, as an addition to the scientific staff of the Island Professor of Chemistry, and a scheme of instruction has been carried out, covering for each pupil a period of two years, and including Theoretical and Practical Chemistry, Agricultural Botany, Agricultural Physics, the Outlines of Physiology and Entomology, the Principles of Agriculture, Technical Tropical Agriculture, Sugar-cane Planting, Sugar Manufacture and Analysis.

In order to bring this course within the reach of the sons of those planters whose incomes were less than £200 per annum, the Department granted several agricultural exhibitions of values varying from £15 to £30 per annum, to Barbados, and two exhibitions of £75 per annum, one for the Windward and one for the Leeward Islands, to defray the entire cost of education at Harrison College, Barbados.

At the end of the course, each pupil is examined by examiners appointed by the Cambridge University Syndicate. The examinations in the more general subjects have been conducted by examiners at Cambridge, while those in the more technical West Indian subjects have been conducted by Mr. Cousins, the Government Agricultural Chemist at Jamaica. The reports of the examiners show that the subjects have been efficiently taught, and that the pupils have acquired a sufficient knowledge of their subjects to fit them to enter successfully and intelligently upon a career of practical agriculture.

The Education of the Estate Overseer.



PROMINENT among the educational efforts of the Imperial Department of Agriculture, has been the provision for the scientific training at Harrison College, Barbados, of lads who

Every student who acquits himself satisfactorily is awarded a Certificate of Proficiency in Agricultural Science, and several holders of this certificate have obtained employment upon estates in Barbados. The reports that reach the Department testify to the fact that the scientific training acquired by them has increased their value as overseers both in the field and in the factory, and support the view, so often urged, that scientific knowledge is of great practical value not only in the laboratory, but in the actual every day work of an estate.

It should be useful to a plantation manager to be able to include in his field staff a young man whose previous training fits him for carrying out, in addition to the ordinary field operations, others such as the application of insecticides, and the detection of insect and fungoid pests; one who is fitted also, to deal with the many problems arising from recent agricultural development in the West Indies, such as the introduction of cotton cultivation, and the closer study of plant pests and diseases.

In the sugar factory these young men should prove especially useful, for they are trained to perform all the chemical analyses required in sugar manufacture. Chemical control in the large factories has long been recognized to be essential, and an increasing number of smaller factories are realizing the necessity of chemical aid to improved work. It is suggested that, as assistants working under expert directions, these young men should meet a distinct demand; a demand that would increase in the future.

It is felt that the existence of this type of educational work should be widely known by the proprietors and managers of West Indian estates, and by all interested in a supply of young men whose education has not been limited to the book knowledge of the ordinary school curriculum, but who have received a training calculated to fit them specially for the needs of modern agriculture in the West Indies.

In the smaller West Indian Colonies, the inducements offered in the way of remuneration and promotion do not appear to be such as to stimulate any great desire to take up agriculture as a profession. There is, in consequence, a strong tendency, even amongst the sons of planters, to leave the country and to seek employment in the towns. This tendency is manifest in the comparatively small number of competitors for Agricultural exhibitions, and it can only be attributed to the small prospects of regular and remunerative employment on sugar and other estates.

The problem is closely connected with the future of the sugar industry. That future depends upon the scientific improvement of the cane and its cultivation, as well as the utilization and scientific control of the modern resources of manufacture. An abundant supply of men who have received this special training would obviously be an important step toward the attainment of these ends.

The problem is also closely connected with the improvement of the position of what is locally known as the 'book-keeper' or 'overseer.' The salaries and conditions of life prevailing at present are by no means always such as to offer strong inducement to young men to take up agriculture. A well-trained man should naturally look forward to slightly higher pay and increased comfort, otherwise there would be nothing to attract him.

The Imperial Department of Agriculture is making a special effort to secure the co-operation of proprietors and managers in providing employment for certificated agricultural students, with reasonable remuneration and prospect of promotion, in all the islands where sugar is still being regarded as a staple industry. The success that has been attained in the case of the young men now serving at Barbados, should encourage a trial of the services of men similarly trained, at St. Lucia, Antigua, and St. Kitt's, as well as at Jamaica and Trinidad.

The Imperial Commissioner of Agriculture will be glad to correspond with the proprietors and managers of estates, and afford full information respecting those who are regarded as qualified for employment as above described.

He hopes, also, to be in a position later on, to recommend young men with special knowledge and experience in the cultivation of cacao, cotton, rubber, and other subjects.

APPOINTMENT VACANT.

The post of Agricultural Instructor under the Imperial Department of Agriculture, is vacant at Dominica. Candidates should be not more than thirty years of age, active, accustomed to ride, and with good experience in practical agriculture, especially cacao planting. Salary £130 per annum, with £20 for horse allowance, and a small personal allowance when absent on duty. Applications, with full particulars as to age and experience, to be addressed to—

The Imperial Commissioner of Agriculture, Head Office, Barbados.



SUGAR INDUSTRY.

The Sugar Trade.

The following note on the sugar trade has been taken from the *Maritime Merchant* for February 22, last:—

The agreement between the Canadian refiners and the West Indian sugar producers expires on July 1, arrangements for the last half of the year being subject to future negotiations. The present terms are similar to those adhered to for the past two years, and are on the basis of the payment of one-half the preference to British producers, which, on the whole, is perhaps not an unfair arrangement, although the West Indian planters think that they should have the whole of it. The early crop estimate for the several islands was as follows: Trinidad, 40,000 tons; Barbados, 45,000 tons; Demerara, 110,000 tons; Jamaica 20,000 tons. The actual results, however, will considerably overrun this estimate. The exports from Demerara for 1905, amounted to 113,247 tons, and at the end of the year, there remained 12,000 tons unshipped. The indications are that the present year's crop will equal that of 1905.

Barbados Molasses.

The *Maritime Merchant* for February 22, last, states that the Customs' department at Ottawa has just made an important decision regarding Barbados molasses:—

During the past year, a quantity of 1,000 to 1,500 puncheons of syrup has been imported at the ports of Halifax and St. John, and entered and sold as molasses. There was some doubt about the matter, which was brought to the attention of the Tariff Commission at one of its recent sessions, and in consequence, samples were sent to Ottawa. As a result, it has been decided that the goods must pay a package duty, and 40c. per 100 lb., making an additional duty of about 4½c. per gallon.

This, contrary to expectation, will, it is stated, not materially increase future prices, as it will be offset by changes in the primary market.

Regarding this, Messrs. S. P. Musson Son & Co., of Barbados, report under date of January 27, as follows: 'The crop of 1906 has been estimated at 47,000 tons of sugar, and 35,000 puncheons of molasses, by the Agricultural Society on the data furnished by the principal planters, so we think this should be fairly accurate. No price has yet been mentioned for sugar, but 13c. (puncheon included), has been offered for molasses.'

Central Factories.

The following is taken from a recent number of the *International Sugar Journal*:—

The success of the Antigua central factories ought to prove a powerful argument in support of those reformers who desire to see similar factories in Barbados and Trinidad. Hitherto, in spite of the attempts made by Sir Daniel Morris and Professor J. B. Harrison to get the Barbados planters to move in the matter, the latter have been too wedded to old

methods to do anything. They cannot, however, go on indefinitely wasting 40 per cent. of their raw material, and now that Antigua sugar is proving better and more profitable than the one time famous Barbados brands, Barbadians may, it is hoped, throw off their conservatism, and go in for large up-to-date central factories. If they do not, they will only have themselves to thank if ruin overwhelms them. There are doubtless many people left who like the Barbados old-fashioned raw sugar; but we very much question whether the demand for it will remain so great as to warrant its manufacturers defying all progressive methods and scientific manufacture. We are glad to see that the Barbados press realizes this, and advocates speedy reform.

Improved Sugar Machinery.

The following extract has been taken from the *Glasgow Herald* for December 30, 1905. It refers to the additional manufacture of sugar machinery for the West Indies by Mirlees, Watson, & Co., Glasgow, and that company's reflections on the bright prospects for the sugar industry between the West Indies and Canada:—

In the British West Indies, only a few extensions and improvements were carried out, owing to the crop being rather under the estimates. As a new field is now open to the British West Indian sugar planters through the preferential tariff given them by the Canadian Government, further improvement and extensions of machinery may be expected there next year. As a matter of fact, there came into Canada from Great Britain in 1900 only \$91,786 worth of sugar; for the year ending June 30, 1905, this rose to \$456,000—an increase of \$364,214. Meanwhile, the imports from Germany of raw and refined sugar fell off from \$3,411,881 in 1900 to about \$13,000 last year. Raw sugar imported during the same time from the West Indies increased from \$160,000 to \$4,000,000; that from British Guiana alone increasing from \$20,000 to over \$2,500,000, practically all of which came in under the preferential tariff. This means an increased demand for sugar machinery for the West Indies. The result of the steam ploughing has been such that steam ploughs are being sent out this year to other sugar estates in the West Indies.

DEPARTMENT NEWS.

The Imperial Commissioner of Agriculture returned from the Northern Islands in S.S. 'Caribbee,' on March 4. While at St. Kitt's, he addressed an important meeting of the members of the St. Kitt's Agricultural Society, on Central Sugar Factories, the Cotton Industry, and other subjects. On March 4, he proceeded to St. Vincent, and addressed a conference of planters in the Court House on March 6, and distributed Diplomas of Merit at the Agricultural Show held at the Agricultural School on March 7. The Imperial Commissioner returned to Barbados in S.S. 'Sibun' on March 8.

The *Official Gazette* of the Leeward Islands for March 1, 1906, announces the return, from leave of absence, of Mr. H. A. Tempany, B.Sc., A.I.C., Assistant Government Analyst, and the resumption of his duties on February 24, 1906.



WEST INDIAN FRUIT.

BARBADOS BANANAS.

The following information with respect to bananas in Barbados has been collected by the Agricultural Superintendent, and forwarded to the Imperial Commissioner of Agriculture. As will be seen from the tables, the results are from three estates, and deal with a total of seventy-seven bunches:—

Estate.	Number of bunches.	Average number of hands per bunch.	Average highest number of fingers per hand.	Average lowest number of fingers per hand.	Average total number of fingers per bunch.	Average net weight per bunch in pounds.
A ...	23	9.2	26.2	10.4	157.1	37.0
B ...	12	9.7	25.2	12.8	173.0	45.4
C ...	42	7.8	21.0	11.5	121.4	30.7
Total...	77	26.7	72.4	34.7	451.5	113.1
Average		8.39	24.1	11.05	150.5	37.37

As the figures given above are averages, it may be of interest to mention a few points in detail. The following table shows the number of hands on each bunch from the three estates:—

Estate.	Number of bunches.	Bunches with eleven hands.	Bunches with ten hands.	Bunches with nine hands.	Bunches with eight hands.	Bunches with seven hands.	Bunches with six hands.	Total number of hands.
A ...	23	1	6	13	3			212
B ...	12	1	7	4				117
C ...	42		2	5	25	6	4	331
	77	2	15	22	28	6	4	660

In addition to this, it may be stated that the number of fingers in a hand was as many as thirty-two in one instance, and frequently as many as thirty and thirty-one. The highest number of fingers to a bunch on estate A, was 194; on estate B, 212; and on estate C, 165. The lowest number

of fingers per bunch on each estate was on A, 112; on B, 138; on C, 88.

With regard to the weight of the bunches, the one containing 212 fingers was the heaviest, having a net weight of 59 lb. The heaviest bunch from estate A, weighed 46 lb., and the lightest 32 lb. From estate B, the heaviest was 59 lb., and the lightest 38 lb., and from estate C, the heaviest was 40 lb., and the lightest 25 lb.

THE WAY TO PACK ORANGES.

The Demerara *Daily Chronicle* for February 13, 1906, states that the Hon. B. Howell Jones received, quite recently, a box of oranges as packed in Spain for the British market. The box has been sent out by way of object-lesson to those who might be induced to start an industry in oranges and other similar citrus fruits between Demerara and the United Kingdom. The fruit, notwithstanding its journey from Spain to London, and then to British Guiana, is stated to have arrived in a thoroughly fresh and sound condition. In the hope that the export trade in oranges might be developed in other West Indian Colonies, as it is in Jamaica, the following suggestions as to grading and packing might prove beneficial:—

The best season for the shipment of oranges to the United Kingdom is as near the months of August and September as possible.

The points to be emphasized are, first, the most delicate picking and handling of the fruit to ensure their safe arrival at port; uniformity in the size of the fruit and of the boxes—the latter should be sufficiently large to hold 150, 175, or 200 of the fruit; and thirdly, uniformity in colour. The oranges selected for export should be fairly large, a good firm fruit, and silky in skin.

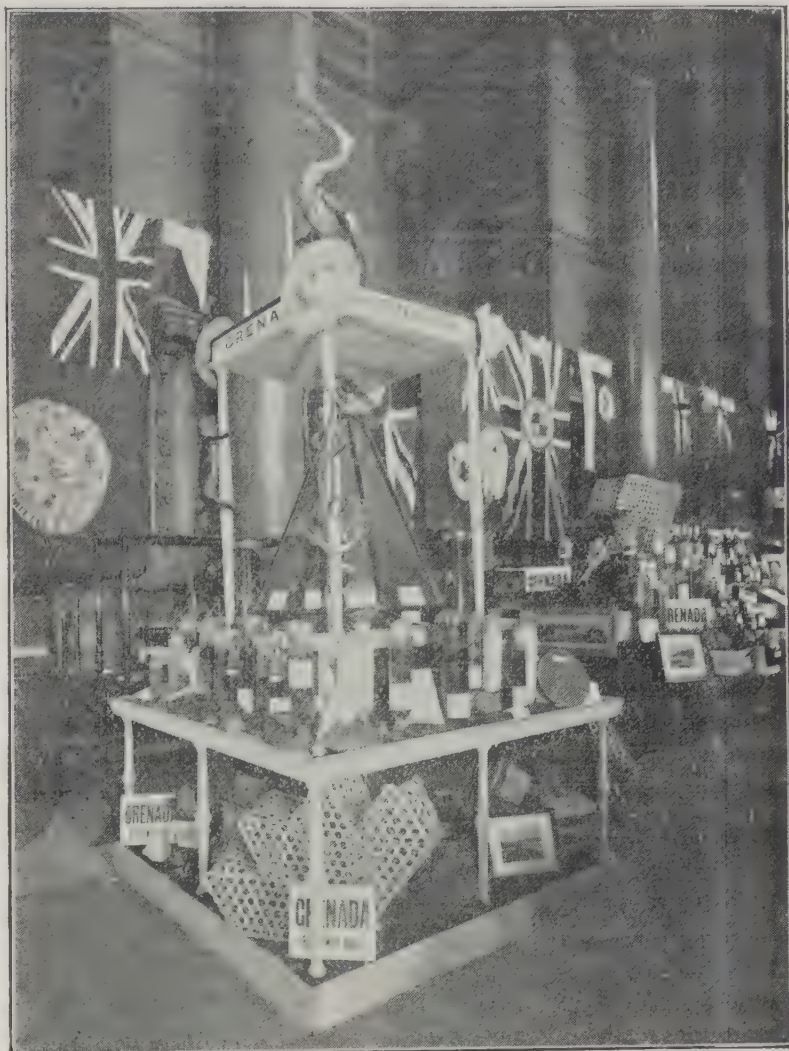
To build up a trade in oranges, it is evident that a constant and untiring supervision would have to be exercised over the labour of the pickers and the packers; and there is no reason why, with a little instruction, the indigenous labouring population in the several West Indian Islands should not readily prove equal to the work required in the handling and packing of the fruit.

The Curator of the Botanic Station, Tobago, writes that two students at the Botanic Station have received positions as assistants on estates in that island. Their places at the Botanic Station were quickly filled from among the numerous applicants, and it would seem that an interest is being awakened among the young men of Tobago, in agricultural work.

THE LIVERPOOL EXHIBITION.

The *West India Committee Circular* for February 16, contains an account of the Liverpool Colonial Products Exhibition, from which the following is extracted. The illustrations, used herewith, have kindly been loaned by the Secretary of the West India Committee, and are the same as those which appeared in connexion with the account referred to:—

The Liverpool Colonial Products Exhibition was brought to a close on February 8. The attendance amounted to 35,000, a figure considerably larger than that of the preceding year, and it was agreed on all sides that this exhibition was the most successful of the series. The Grenada section continued to attract a large share of attention, and the West Indian Fruit Court was continually thronged with visitors. Upwards of 2,000 copies of the pamphlet 'Notes on Grenada' by Mr. C. Falconer Anton, Secretary of the Grenada Agricultural and Commercial Society, which has been favourably commented upon by the press, were distributed, and much other literature, descriptive of the various exhibits, was circulated. Already, the usual crop of applications is beginning to be reaped as a result of the exhibition, notable among which are inquiries regarding Grenada bees'-wax, which was reported upon most favourably by two of the largest importers of this commodity, and for cotton seed for oil cake purposes, from both of which it is hoped, to use a commercial expression, business will result. Many sample orders were also booked for arrowroot, cigars, preserves, etc. When dealing with the exhibition, special mention must be made of the admirably arranged display of British grown cotton, arranged by Mr. W. G. Freeman, Superintendent of Economic Collections at the



THE GRENADA SECTION AT LIVERPOOL.

In this picture the cone-shaped stand for displaying cacao is clearly shown. The curious basket underneath is one of the local 'fish pots.'

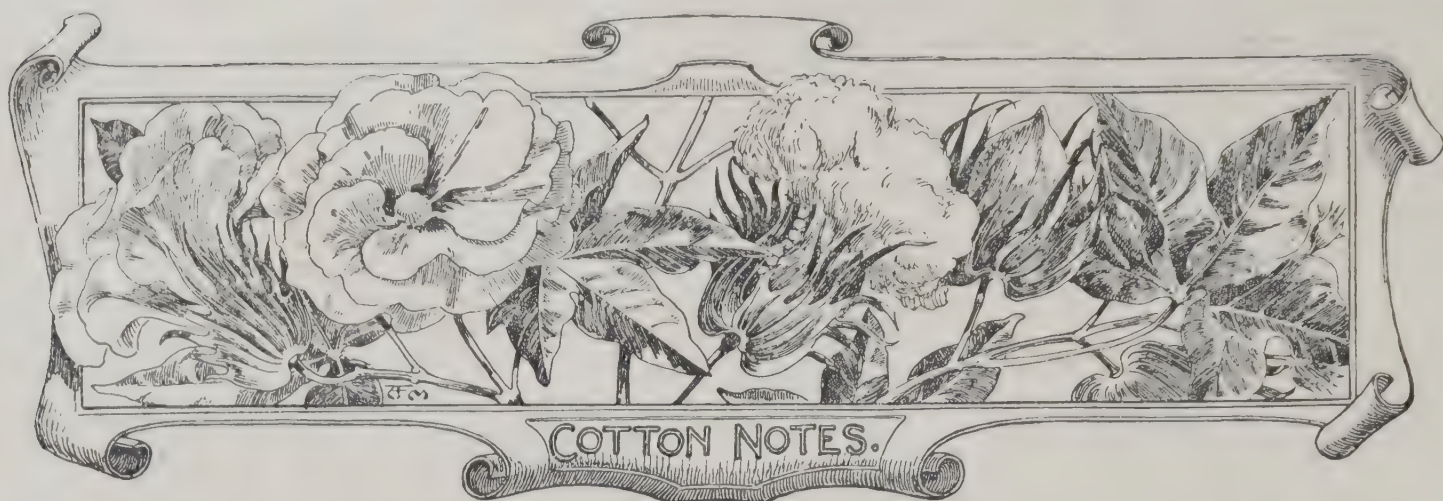


THE WEST INDIAN FRUIT COMPANY.

One of the most successful sections at the Liverpool Colonial Products Exhibition was the West Indian fruit court. The stalls were decked in a drapery of pale-green and white muslin, and the general effect was most pleasing. The court was thronged with visitors.

Imperial Institute, conveniently placed at the entrance of the exhibition, so that every visitor could not fail to be impressed by the work which is being done by the British Cotton-growing Association, of which this exhibit gave a good indication. Cotton in every stage of growth was shown, the whole exhibit being so arranged that the life-history of the plant from the seed to the factory could be traced. The greatest credit is due to the organizers of the exhibition for the successful manner in which the arrangements were made and carried out, resulting as they did in this exhibition being one which will have the result not only of making the West Indies better known by those at home, but also of stimulating the colonies themselves, and causing them to realize how desirable it is to participate in such exhibitions.

The Secretary of the West India Committee in a letter to the Imperial Commissioner of Agriculture, dated February 8, 1906, writes as follows: 'The Liverpool Exhibition closes to-day, and from the amounts which I am receiving from Mr. Hankinson, it would appear to be proving very successful. Certain it is that a large number of people who were ignorant of the existence of Grenada, are now interested in this island, and already the usual inquiries are beginning to come in regarding it.'



PROGRESS OF WEST INDIAN COTTON.

The following remarks on the progress of the cotton industry in the West Indies are taken from the *Textile Mercury* for February 17, last:—

At a meeting of the West India Committee of the British Cotton-growing Association, held in Manchester on Friday of last week, letters were read from Sir Daniel Morris, stating that the gold and silver medals presented by Sir Alfred L. Jones for the best cotton grown in the various islands were much appreciated, and that there would be keen competition for them. It was reported that the new crop was coming forward rapidly; and, taking the islands as a whole, there would be a much larger crop than last year, and that the cotton was selling at good prices.

Extracts read from the *West India Committee Circular* showed that in Antigua the crop was turning out much better than was expected, considering the small rainfall. In Nevis, cotton was claiming universal attention, and there was no doubt it had come to stay. The crop this year should be somewhere about 1,000 bales of 200 lb. each, which even at 1s. per lb. would represent an output of £10,000. Had the weather been favourable in the first instance, the crop would have been nearly double. In St. Kitt's, cotton picking was making good progress, and the yield was likely to be large. At St. Vincent, the prospects were even better than on the occasion of the last report. St. Vincent commanded the highest price for Sea Island over all comers. The Curator of the Botanic Station, Bahamas, acknowledged the receipt of the £100 granted by the association as prizes for planters.

SEA ISLAND COTTON.

The *Cotton Trade Journal* for February 10, 1906, states that the Sea Island cotton market for the week ending February 9, closed firm at an advance, with the demand better than it has been for some time past. The low and medium grades were especially wanted, with highs somewhat neglected in the trading, though they were wanted as well as the others.

The week was an interesting one from many stand-points. At Valdosta the growers held a convention, and decided upon a cut of 25 per cent. in the acreage. It is pretty certain that a good reduction will be made in the coming Sea Island acreage, as compared with last year. The fact, that in much of the Sea Island territory either Upland or long cotton may be grown, makes it easy for planters to make a change. They are thoroughly dissatisfied with the prices paid them during the past season, and intend to try a more profitable tack with another staple. The week's sales of 4,343 bales took a considerable part of the local stock.

SEED SELECTION.

A Barbados cotton planter, who has carefully examined and compared the lint from different plants, has found that some produce much better cotton than others, and he believes that it is necessary to get the seed for cultivation from such plants.

This is the principle on which scientific seed selection is based, and that to which the present excellence of Sea Island cotton is due. The Imperial Department of Agriculture has advocated such a system of seed selection, and during the season now coming to a close, plants have been selected on a number of estates in Barbados. The seed from the best plant on each estate will be sown in plots from which further selection will be made next season, while, from the remainder of the selected seed, will be produced that for planting the general crop of the following season.

In an editorial in the *Agricultural News* for December 23, 1905, the process of seed selection was dealt with, and an explanation given of the qualities that would be taken into account in determining whether the seed from any plant was good enough to be sown for further selection in the following year.

COTTON IN ST. VINCENT.

The Agricultural Superintendent, writing under date of March 3, makes the following statements with regard to cotton in St. Vincent:—

To date, 96,554 lb. of lint have been ginned at the central cotton factory, and with the seed-cotton on hand there, this total will be increased to over 100,000 lb. early next week.

Supplies of seed-cotton are now coming forward very slowly, but there is still a good quantity on the estates, which is being sorted as rapidly as possible.

The account sales have been received for the first shipment of 5 bales of Mustique cotton, and they show that the whole shipment was sold at the rate of 1s. 5d. per lb. This is very satisfactory.

Proportion of Lint to Seed. The low proportion of lint to seed in the seed-cotton reaped during the first part of this season, appears to have been fairly general throughout the West Indies. In some instances, the proportion fell as low as 23 per cent., the normal being 28 to 30 per cent. of lint to seed. This fall of 5 lb. of lint in every 100 lb. of seed-cotton is considerable. It is encouraging to note that the proportion has now changed, and, as the end of the first picking approaches, it comes nearer the normal, as high as 29.9 per cent. of lint having been recently reported in St. Vincent. (See *Agricultural News*, Vol. V, p. 71.)

SEA ISLAND COTTON MARKET.

The Sea Island Report, dated February 10, 1906, furnished by Messrs. Henry W. Frost & Co., of Charleston, South Carolina, contains the following:—

Islands.—The market was quiet and unchanged throughout the week, with sales of only one crop lot of 50 bags at 28c., and 20 bags of odd bags of fully fine at 23½c.

There was some inquiry for crop lots at lower prices than factors were willing to accept, and as they are still refusing to lower their prices for the odd bags, we have only to repeat our last quotations.

The report, of February 17, on Sea Island cotton contains the following:—

Islands.—The market throughout the week was quiet and unchanged, with some inquiry for crop lots at lower prices than factors were willing to accept. For the odd bags of fine and fully fine, factors were continuing to hold for their previous asking prices.

After the close of the official report, three small crops were sold for France at 27c. to 30c., and 150 bags of odd bags fine and fully fine, off in preparation, at 16½c.

COTTON IN ST. KITT'S.

The Agricultural Superintendent at St. Kitt's, in a letter dated February 13, furnishes the following with regard to a field of cotton on Conaree estate in that island:—

This field of 12 acres has already yielded 3,774 lb. of lint, and there are between 400 and 500 lb. of lint now to be picked, which will give an average of 350 lb. lint per acre from the first picking. The percentage of lint to seed at the ginnery from this large quantity, was 27.5.

THE COLONIAL EXHIBITION, 1905

The General Report on the West Indian court of the Colonial Exhibition, which was held at Sydenham during the summer of 1905, has just been received. It has been prepared with great care by the Secretary of the West India Committee (Mr. Algernon E. Aspinall) to whom the West Indies are largely indebted for the success of this exhibition.

The report is an interesting publication, and the notes on the exhibits, from the pen of Mr. W. G. Freeman, B.Sc., F.L.S., contain full descriptive accounts of the several West Indian courts. The pamphlet is illustrated with excellent photographs of the different sections, and of some of the principal exhibits. Copies may be obtained from the local Secretaries of the Exhibition Committees in the islands represented.

The origin of the exhibition, says the report, was due to the proposals of the Crystal Palace Company, and the representation of the West Indies was brought about through the instrumentality of the West India Committee.

On May 24, 1904, circular letters were sent to the honorary correspondents of the West India Committee in the West Indies, asking them to ascertain the views of the colonies on the subject, and to the local Governments inviting financial support, and the matter was at once warmly taken up by the leading planting and commercial bodies and the press throughout the West Indies. Several islands did not see their way to participate, owing to financial reasons, but a prompt response was received from

Jamaica, Trinidad, Barbados, and Grenada, and, before the close of 1904, each of these colonies had appointed an energetic local committee with the view to making the necessary arrangements, and sums of money were eventually voted by the legislatures for defraying the expenses of the representation of these islands.

The condition and labelling of the exhibits are reported on as follows:—

The exhibits as they arrived from the colonies were not immediately brought up to London, it being felt that it would be best for the court to be erected before the process of unpacking, with its inevitable confusion, was begun. On the whole, the goods were extremely well packed, and in this connexion, special mention must be made of those from Barbados and Trinidad. Notwithstanding the fact that the cases were opened by the Customs, the breakages and losses were few and far between. As regards the individual exhibits, a marked improvement in the manner in which they were put up was noticeable. Tall specimen bottles were used with advantage in many cases, but there was still a certain number of samples of preserved fruits, etc., so badly bottled—in every conceivable size and shape of jar, with hideous masses of sealing wax on them—as to render them not only unsightly, but also useless from a commercial point of view.

Besides the desirability of the adoption of greater uniformity in the putting up of exhibits, the committee would like to call attention to the labelling of them. This, in most cases, was entirely inadequate. The best effort in this direction was undoubtedly made by Barbados. In this section, distinctive labels bearing the arms of the colony were fixed to each exhibit, but unfortunately, being made of parchment, they would not adhere to the bottles, and required constant attention. The committee would suggest that in future exhibitions, this matter should receive special attention, as much of the utility of exhibits depends upon their being efficiently labelled, and they would further suggest that the practice adopted by the Imperial Institute might with advantage be followed. There, small labels of a uniform character are attached to each exhibit, giving not only the name of the exhibit, but also a brief descriptive note regarding its origin and use.

The report concludes with the suggestion that each of the colonies should seriously consider the appointment of a Permanent Exhibition Committee to act in conjunction with a similar committee in London.

ANTIGUA AGRICULTURAL SOCIETY.

The *Antigua Standard*, in a late issue, gives an account of a meeting of the Agricultural Society, on the invitation of the Hon. Francis Watts, C.M.G., D.Sc., to visit the Botanic Station, School gardens, and Government farm.

The meeting was attended by twenty-two members of the society. At each of the places visited, Dr. Watts and Mr. Jackson, the Curator of the Botanic Station, explained the work that was being done. Much valuable information was imparted in this way, and several of those present obtained a much better idea of the practical application of scientific agriculture than they had previously possessed.

This would seem to be an excellent plan for bringing before the agricultural community the work of the Department of Agriculture in each island, and, more than almost any other plan, is likely to place the members and others in closer touch with the scientific work that is being carried on with the view of assisting to improve local industries.

EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming, should be addressed to the Commissioner, Imperial Department of Agriculture, Barbados.

All applications for copies of the 'Agricultural News' should be addressed to the Agents, and not to the Department.

Local Agents: Messrs. Bowen & Sons, Bridgetown, Barbados. *London Agents:* Messrs. Dulau & Co., 37, Soho Square, W., and The West India Committee, 15, Seething Lane, E.C. A complete list of Agents will be found on page 3 of the cover.

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Agricultural News

VOL. V. SATURDAY, MARCH 17, 1906. No. 102.

NOTES AND COMMENTS.

Contents of Present Issue.

The editorial in the present issue deals with the education of young men to fit them for the duties of estate overseers. The course of study offered in Agricultural Science at Harrison College is outlined, and some of the special benefits likely to result from such training are mentioned.

An account of the Liverpool Exhibition will be found on p. 85. The excellent illustrations should add to the interest of the article.

The report of the Colonial Exhibition, 1905, is reviewed on p. 87. This report is very useful, dealing with the matters of packing and labelling exhibits. It also suggests the appointment of Permanent Exhibition Committees.

The insect notes in this number give an account of a weevil found in the seeds of growing mangos in in Hawaii, and of a powder bellows which was used during the past season in the Sea Islands for applying Paris Green to cotton.

On p. 91, will be found an account of the recent visit of the Imperial Commissioner of Agriculture to St. Lucia, and a review of the condition of the various agricultural industries.

The fruit notes on p. 84 in this number include an account of some interesting returns with regard to Barbados bananas, giving figures to show the sizes of the bunches, the number of fingers per hand, etc. There is also an interesting note on the packing of oranges.

The Agricultural Don'ts on p. 90 contain good advice in short, pithy statements. They are taken from *Agricultural Practices and Morals*, by E. J. Wortley, reviewed on p. 93.

An article on Agriculture in Trinidad, on p. 94, gives brief statements on many points of agricultural interest in the different Ward Unions in that island.

A New Method of Packing Seeds.

In the *Bulletin of Miscellaneous Information* of the Botanical Department, Trinidad, for January last, it is stated that Messrs. Sutton & Sons of Reading, England, are now packing seeds for the tropics in fine or thin metal containers which have been hermetically sealed in dry air. This process will secure the seeds from the effects of humidity of climate, and from the attacks of small insects. The packages cost about 1d. each more than the ordinary paper envelopes, and the seeds are preserved in a fine condition, some 100 per cent. longer than by the old method, and will not perish while in the hands of the seedsman who undertakes their sale locally.

Tomatos at Montserrat.

The following note on tomatos cultivated in the garden of St. Mary's School, Montserrat, has been furnished by the headmaster, Mr. R. A. Barton:—

Seeds were sown in a box and in bed A at the same time—early in October 1905. When about 6 inches high, seedlings were transplanted from the box to bed B, and those in bed A were thinned out. Crops were reaped at the end of January 1906. From one of the plants raised in the box, three tomatos were cut off the same stem. The total weight of these was 62 oz.

From another plant, in bed A, which had not been removed, three tomatos weighing 38 oz. were picked. Both plants are still fruiting.

A small portion of stable manure has been applied to each bed.

Is Sugar an Explosive?

An editorial note in the *Louisiana Planter* for February 10, last, brings forward the question as to whether or not sugar is an explosive. Reference is made to the burning of a Colorado beet-sugar warehouse, in which a large quantity of sugar was destroyed by fire, which, it was held, was caused by spontaneous combustion. More recently, a correspondent has given further data on this point. It is now learned from the *Menominee* (Michigan) *News* that in a recent insurance case tried there, an expert, Mr. H. W. Tideman, general manager of the electrical and mechanical works, said that if sugar were confined it would become explosive, and this evidence was introduced by the plaintiffs to account for an explosion which was heard during the fire. It is stated, however, that last winter, when some 12,000 to 15,000 barrels of sugar were burned at the Stuyvesant Docks in New Orleans, no noticeable explosion was observed.

West India Committee Circular.

The *West India Committee Circular* is now registered at the General Post Office, London, and is published weekly, instead of fortnightly, each issue being in a cover. Readers of this interesting publication will gladly welcome this change.

West Indian Cotton Industry.

A comparison of a summary of the cotton industry in the West Indies for the year 1904 with a corresponding summary for the year 1905 shows that, from an output of 695,981 lb. of lint in 1904, the industry increased by nearly 62 per cent., or to an output of 1,122,800 lb. of lint in 1905. The value of the products (in lint and seed) increased from £30,056 in the former year, to £63,291 in the latter, an increase of about 110 per cent.

It is interesting to note that the total value of the cotton industry in the West Indies for the last two years has reached £100,000. As probably between 60 and 80 per cent. of the cost of raising cotton, (depending on the locality) is distributed in wages, it would appear that the cotton industry is a valuable means of improving the condition of the labouring population, especially in the smaller islands.

The Mosquito Ordinance of British Honduras.

The Government of British Honduras has recently brought forward a bill 'to secure the destruction of mosquitos in order to prevent the spread of disease.' The following are some of its chief provisions, as noted in the *Demerara Daily Chronicle* in its issue of February 13, 1906:—

The bill proposes the appointment of the Colonial Surgeon, the Superintendent of Police, the Colonial Engineer and other officials, as competent authority to carry out the provisions of the ordinance. This authority, it is contemplated, will have power to order owners and occupiers of property to take measures for protecting from mosquitos, water-vats and other receptacles 'in which water is stored for a period of longer than one week.' Under the provisions of the ordinance, water containers must be screened with netting, and owners and tenants of land and premises 'on which there is any water in ponds, pools or basins, or in any depressions or excavations made for any purpose, or which by any means have occurred, shall, within forty-eight hours of service of a notice, protect the same from mosquitos.' This protection may be secured by stocking the pools with mosquito-destroying fish, by covering them with netting, or by draining at least once weekly. The ordinance also makes provision for the removal of 'all old receptacles such as jars, broken crockery, condensed milk tins, and other rubbish,' and owners of doreys and boats must keep them free of water. The officers appointed will be at liberty to enter premises without notice, and to treat with oil, cisterns improperly screened, in order to prevent the breeding of mosquitos, and owners or occupiers failing to comply with the terms of the ordinance, will be liable to a fine of \$50·00, with the alternative of three months' imprisonment.

Cotton Seed for Planting in 1906.

Last year, the Imperial Department of Agriculture undertook to supply specially selected and disinfected cotton seed obtained from well-grown, healthy plants that had yielded first class cotton.

The results of the action thus taken are shown in the high character of the lint produced this year, and the generally favourable prospects of the industry. The first shipments from Barbados in 1906 have already realized 16*d.* to 16½*d.* per lb., while a small shipment from St. Vincent has realized 17*d.* per lb.

In order to continue to afford assistance to cotton growers in regard to one of the most important matters connected with the success of the industry, the Imperial Department of Agriculture is prepared to supply *specially selected and disinfected cotton seed* for planting during the months of May to August, next, at the rate of five cents (2½*d.*) per lb. Applications for such seed should be forwarded to the Chief Agricultural Officers in each island as follows: For Antigua and Montserrat, to the Hon. Francis Watts, C.M.G.; for St. Kitt's, Nevis, and Anguilla, to Mr. F. R. Shepherd; for Barbados, to Mr. J. R. Bovell, F.L.S., F.C.S.; for St. Vincent, to Mr. W. N. Sands. Applications from Jamaica, British Guiana, Trinidad and other colonies not mentioned above, should be forwarded direct to the Imperial Commissioner of Agriculture, Head Office, Barbados. All applications will be dealt with in the order in which they are received.

Plants in Bermuda.

In an article entitled 'Bermuda in September,' which appeared in the *Journal of the New York Botanical Garden* for October, 1905, Dr. N. L. Britton writes interestingly of his visit to these islands, for the purpose of making some study of the land flora of the Archipelago, and its relationship to the flora of the West Indies, and of the Southern States; and of obtaining specimens and plants to illustrate it in the collections of the New York Botanical Garden.

Of the land flora occurring in the wild condition, exclusive of fungi, lichens and algae, there are about 280 species. The distribution of this flora is almost wholly West Indian and Floridian, thus indicating that it has been mainly derived from the south and south-west through natural agencies for the transport of seeds or fruits, such as migratory birds, ocean currents, and hurricane winds.

The rarest trees of the islands are the olive wood (*Elaeodendron* sp.); the yellow wood (*Fagara flava*); nettle tree (*Celtis* sp.); and the wild mulbury (*Morus* sp.). Of the exotic plants, there is a very great variety of species from tropical and subtropical lands.

Experimental gardens have recently been established under the supervision of Mr. T. J. Harris, formerly of the Department of Public Gardens and Plantations of Jamaica, and it is expected that, with his wide experience and critical knowledge of tropical agriculture and horticulture, the exportable products of the islands—potatos, onions, lily bulbs and arrowroot will be improved, and their cultivation made more successful.



INSECT NOTES.

The Acme Powder Bellows.

In a recent number of the *Agricultural News* (Vol. V, p. 46) mention was made of the use in the Sea Islands of South Carolina of a small hand bellows for applying Paris green to cotton plants. One of these machines, which is marked the 'Acme Powder Bellows,' has been obtained by the Imperial Department of Agriculture. It is a very simple hand bellows with handles about 18 inches long, and with a funnel at the nozzle end. About $\frac{1}{4}$ lb. of Paris green is used as a charge for the machine, and it is thrown out by quick pressure on the handles. A small inverted cone inside the funnel helps to spread the poison, which comes out with some force, and with a good tendency to spread. The cost of this machine should be small, and it seems likely that a labourer will be able to accomplish much more with it than with the bag, which is ordinarily used.

Field experiments are, however, necessary to prove its value when used on a large scale. According to the printed directions which accompany each bellows, only pure Paris green should be used, but from the few trials already made, it seems likely that the mixture of lime and Paris green, which is used in the West Indies, could be satisfactorily applied by means of this machine.

The Mango Weevil in Hawaii.

In a recent number of the *Hawaiian Forester and Agriculturist* an account is given of the mango weevil (*Cryptorhynchus mangiferae*, Fabr.):—

It was first noticed in Hawaii in 1905, when there were found in mango seeds, the larvae and pupae of a beetle, which during their larval development had fed entirely on the seed contents.

Since the life-cycle is passed within the seed, and the female, as is customary with the species of this family, deposits the egg in the food of the larva, the insect must have been introduced in fruit or seeds of the mango, brought to the islands for propagation, from India or possibly the Philippines. It is evident that the fruit is infested in the very early stages of its development, since there is no indication of the entrance of the larva into the seed through the seed husk. The work of the very young larva is evident, but no point of entrance is to be observed. It would seem that the length of the life-cycle of the insect is somewhat longer than the time of development of the fruit, from the fact that seeds removed from matured mangos contain the larval weevil.

By removing the husk of the seed, the presence of the weevil is easily detected, and therefore all seeds planted should be thus treated. This is good horticultural practice in any event. Until the distribution of this insect pest in the islands, and its life-cycle, habits, and food plants are better understood, it is urged that mangos should not be indiscriminately distributed from place to place. At the beginning of the next mango season, an inspection of the various districts will be made, and it is hoped that, by that time, practical and efficient measures of controlling the pest

can be given. If the insect is found to attack only the mango, and its present distribution is determined as being confined to certain districts, it may be that by a rigorous quarantine and the destruction of the crop, the pest can be stamped out.

As to direct remedies, if it is found that infested fruits fall to the ground, they should be collected and destroyed. It may be that, as is the practice with the Plum Curculio, the adult beetle can be jarred from the trees on to sheets in the early season before they infest the fruit; or, if the adults feed on the leaves of the mango, they can be poisoned by spraying with Paris green or Arsenate of lead.

AGRICULTURAL DON'TS.

The following are the *Agricultural Don'ts* to which reference has been made in the review of a Jamaica book entitled *Agricultural Practices and Moral's* given on p. 93:—

- (1) Don't have the land about your house uncultivated and in bush. A clean yard means a healthy house.
- (2) Don't be too careless (or lazy) to dig deep and often, to water freely, and to manure and weed regularly. The wealth that lies in our soil requires digging for. Plants obtain food more readily in a well-tilled soil. Water is both a food and a food-carrier. Manure makes your land rich. It is only paying your debt to the soil. Weeds rob the plant of food and water, and look ugly.
- (3) Don't plant any but the best seeds from the best plants. If the *best seed* be planted, and the *best care* be given to the growing plant, you may expect to reap the *best harvest*.
- (4) Don't allow any fruit that is to be sold or shipped to be bruised in any way. Bananas, oranges, or other fruit that is allowed to fall to the ground, or is squeezed, or sat upon in cart or hamper, will surely show the damage later on, and bring low prices.
- (5) Don't spoil your market, and injure the reputation of Jamaica, by selling bad stuff. Oranges unfit for food; corn, coffee, cacao, ginger, and pimento, cured over a fire, or on a dirty barbecue, or not thoroughly dried and cleaned, all spoil your prices, and disgrace the island.
- (6) Don't neglect to destroy caterpillars and other destructive insects, as soon as you see them. The first few caterpillars may easily be killed, if you keep your eyes open. If allowed to live, thousands may follow, and the loss caused may be great. 'A stitch in time saves nine'—or nine hundred!
- (7) Don't starve, overwork, or in any way ill-treat any animal. A good man or woman *can* not; a sensible man or woman *will* not.
- (8) Don't neglect to see that all animals under your care are regularly and well fed. People like their meals regularly; so do dumb animals.
- (9) Don't forget to keep all your animals and their surroundings clean. Pick off ticks; cleanse sores; groom regularly. 'Prevention is better than cure.'
- (10) Don't tolerate the praedial thief. True sons and daughters of Jamaica must never speak to, or have anything to do with, any one who steals from another man's 'ground,' garden, or home. Be honest in even the smallest things. An employer's goods or stock should be handled at least as carefully as your own.

AGRICULTURAL EFFORTS AT ST. LUCIA.

The Imperial Commissioner of Agriculture attended a conference of the members of the Agricultural Experiments Committee at St. Lucia on February 9, last, his Honour the Administrator in the chair.

SUGAR.

A summary of experiments with new seedling canes was presented, together with a report on the condition of the new experiment plots at Roseau, Vieux-fort, Cul-de-Sac, and Dennery. The Hon. E. Du Boulay reported favourably of his experience with seedling canes B. 147 and B. 208. His Honour E. G. Bennett stated that B. 208 was the variety that best suited his locality. Suggestions were offered for extending systematic experiments with canes at St. Lucia, and for the employment of trained men to analyse the juice, and supervise experimental work in the fields.

CACAO.

In a review of the work carried on during the last five years in connexion with experimental cacao plots in various districts of the island, under the control of the Agricultural Instructor, a summary was presented and endorsed by those present. Briefly stated, the results are as follows:—

At Soufrière a 1 acre plot (which had no trees in bearing in 1900) was taken in hand by the Imperial Department in 1901. For an expenditure, in the five years ended 1905, on cultivation, manures, etc., of £34 8s. 11d., a total yield was obtained of 2,288 lb. of cured cacao, which (valued at 6d. per lb. of well-cured cacao) showed a gross return of £57 4s. or a profit, in five years, of £22 15s. 1d.

A similar plot at Dennery (which had no trees in bearing in 1900) had £20 5s. spent upon it in 1901-3, and yielded, in the three years, 1820 lb. of cacao, valued at above basis at £45 10s. showing a profit in three years of £25 5s.

An abandoned field of cacao, 1 acre in extent, at Roseau, for an expenditure of £27 2s. 2d. in 1901-5, yielded 2,955 lb. of cured cacao valued, as above, at £73 17s. 6d., showing a profit in five years of £46 15s. 4d.

The details of the cultivation and manures used are given in the Annual Reports for the years 1901-5.

The Imperial Commissioner suggested a new series of experimental plots of cacao to consist of 5 acres or 1,000 trees, each divided into five sections. These plots would be supervised by the officers of the Department, on condition that the proprietors defrayed the cost of labour and manures. The suggestion was favourably received, and steps were to be taken by the Agricultural Instructor for selecting plots in suitable localities for the purpose.

FRUIT INDUSTRY.

A report was presented on the nursery plots which are being established at Cul-de-Sac, Union and elsewhere, for raising and distributing suckers of the Chinese or dwarf banana. While the industry was developing it was recommended to utilize the fruit locally. Green dwarf bananas, when suitably cooked, were as good as if not a better vegetable than plantains. About 4,000 plants of this banana are now available for propagating purposes.

RUBBER.

Reference was made to the favourable reports (published in the *Agricultural News*, Vol. IV, p. 380) on the samples of *Castilloa* rubber obtained from trees grown at the Botanic Station. The biscuit rubber was valued at from 4s. 9d. to 5s. per lb. These prices were regarded as proving that rubber cultivation was capable of becoming a successful industry at St. Lucia. About 100 rubber trees up to eight years old were reported as doing well amongst cacao at Errard estate. The Imperial Commissioner stated that a good

supply of seed and plants of *Castilloa* would be placed within the reach of planters during the coming season. The officers of the Department would also prepare a leaflet giving information as to selecting land, and starting the cultivation amongst cacao or otherwise. The Administrator expressed great interest in the prospects of rubber cultivation in the colony.

COTTON.

The Imperial Commissioner expressed his disappointment that Sea Island cotton had not hitherto been successfully produced in St. Lucia. He was satisfied, however, that in some of the drier districts with suitable soil, the industry was capable of being established. It was his intention to recommend further trials in this direction.

FUMIGATION OF SEEDS AND PLANTS.

The Imperial Commissioner impressed on the Committee the necessity, in such an agricultural island as St. Lucia, for fumigating all imported seeds and plants in order to prevent the introduction of noxious pests. It was agreed that this was desirable, and a recommendation to that effect was adopted by the meeting.

During a stay of about a week at St. Lucia, the Imperial Commissioner conferred with the Administrator and the leading members of the planting community, and discussed in detail the agricultural needs of the colony. He also visited Dennery Sugar Factory on the Windward Coast, and afterwards crossed the island by the Goldsworthy Road to the Cul-de-Sac valley where he spent two interesting days with his Honour E. G. Bennett in visiting the sugar factory, the sugar experiment plots, and the cacao areas.

The general impression left on the mind of the Imperial Commissioner was that the cacao plantations which he saw in the vicinity of Dennery and elsewhere, could be made to yield double the present crops, at a comparatively small outlay and without extending the area under cultivation, while in regard to the cultivation and treatment of both sugar and cacao in the Cul-de-Sac valley, these were equal to anything he had seen in any part of the West Indies. The Imperial Commissioner proposes to pay another visit to St. Lucia, when he hopes to proceed to Roseau, Soufrière and the southern districts of the island.

COPRA.

In the *Hawaiian Forester and Agriculturist* for November 1905, the following information is given with regard to copra:—

The best copra is made by drying the meat of the cocoa-nut in houses, or drying machines heated by steam; although, if the climate is a sufficiently dry one, sun drying produces very good results, if the meat is kept clean. The grading depends on the dryness, cleanness, and sweetness of the meat. The market price varies considerably. It has been as low as \$50·00 or \$52·00, and as high as \$85·00 per long ton. The present price in London is about \$80·00 or \$81·00 per ton.

It is stated that there is at present no market for copra in the United States of America, because there is no supply available in any quantity, all the cocoa-nuts grown and shipped from Ceylon, the West Indies, and Central America being used for desiccated cocoa-nut. The product is rapidly growing in importance, and it is considered hardly possible to overload the market. The development of this industry should prove of great value in those colonies where cocoa-nut trees grow and thrive, as the United States will probably take large quantities of copra when available.



GLEANINGS.

Says the *Demerara Argosy* of February 24, last, the North-West steamer arrived from Morawhanna yesterday with a little over 1,000 lb. of Venezuelan balata.

Messrs. Wolstenholme & Holland, writing under date of February 8, state: 'We have to report a good demand for West Indian Sea Island, and all desirable lots are quickly bought up. Owing to the careful preparation of Barbados Sea Island, this growth has commanded prices from 15*d.* to 17*d.*, in spite of a falling market for Carolinas in Charleston, and more pressure to sell.

The Curator of the Botanic Station in Dominica reports that during February last, the Litchi (*Nephelium Lit-chi*) was in flower in the gardens. This, it appears, is the first time that this plant has flowered in Dominica. Speaking of the Longan-tree (*Nephelium Longana*), and the Rambutan (*N. lappaceum*), the Curator says that these do not appear to be grown in the West Indies, and suggests that the seed of these species might be obtained from the East.

The prison farm at Suddie is making great strides. A considerable area of land has been cleared, much of it by the exertions of the female prisoners convicted after the riots. Over 150 young cocoa-nut trees have been put in. The land is being planted with rice, Indian corn, sweet potatoes, plantains, and cassava. The provisions grown are used in the prison, and sold. It is hoped in the near future to make Suddie prison largely self-supporting. (*Demerara Argosy*, February 24, 1906.)

The following extract from a letter from Messrs. Wolstenholme & Holland to the Imperial Commissioner of Agriculture, gives a very encouraging report of West Indian Sea Island cotton in the Liverpool market: 'This season's crop from the West Indies is beautiful, and in spite of good Sea Island crop lots (from South Carolina) offering at 14*d.* and 15*d.*, we can get 16*d.* and 17*d.* per lb. easily, for the West Indian, and buyers, including France, admit that the British West Indian cotton is preferable. This is owing to the cotton having been well grown, and in consequence much more lustrous and bright than the Carolina.'

The *Temps* of January 23, quotes from the *Bulletin Economique de l'Indo-Chine* an estimate by MM. Brenier and Claverie of 57,000 tons as the world's production of rubber, for 1904. Of the total, 33½ per cent. came from America and 21½ per cent. from Africa. French West Africa produced 7,000 tons, the Belgian Congo 6,000 tons, and the French Congo 3,000 tons. The world's consumption is estimated at 57,300 tons in 1904, of which the United States took 26,470 tons, Germany 12,800 tons, the United Kingdom 10,030 tons, and France 4,130. The Brussels *Mouvement Géographique* puts the production at 75,000 tons. (*West India Committee Circular*, February 16, 1906.)

The *Demerara Argosy* for February 10, 1906, says that the Berbice Agricultural Show will be held in New Amsterdam on March 21, 22, and 23. Over \$1,000 in prizes are offered for competition in exhibits of fruit, vegetables, economic products, live stock, plants, cut flowers, handicrafts, needle, and fancy work.

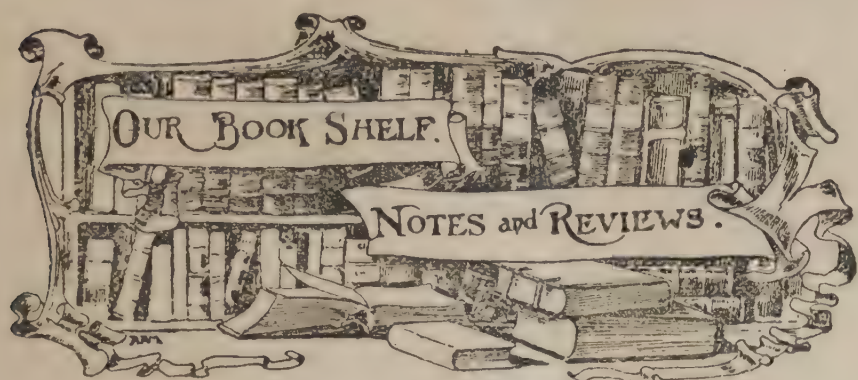
With regard to Para rubber seeds (*Hevea brasiliensis*), the *Port-of-Spain Gazette* for February 9, 1906, says that advices from Ceylon intimate that orders can be placed in that colony up to 500,000 seeds. The supply of seeds in Trinidad being inadequate to meet local demand, it is suggested that this is a favourable opportunity for obtaining reliable supplies. All information will be furnished at the office of the Experiment Station, St. Clair.

Mention was made in the *Agricultural News* (Vol. IV, p. 299), of a scheme initiated by the Administrator of Dominica for insuring plantations in the Lesser Antilles against the effects of hurricanes. The matured scheme allows estates to insure trees and crops against hurricanes, floods, and volcanic eruptions. The matter is now in working order, and planters can, by payment of a moderate premium, insure their cultivation and crops. The planter should now be in a position to face the future with an equanimity not hitherto possible.

A short review of a paper by Mr. H. H. Hume, from Bulletin 74, Florida Agricultural Experiment Station appears in *Zeitschrift für Pflanzenkrankheiten* for January, 1906, and describes experiments that have been carried out in reference to anthracnose of the pumelow. This disease is caused by a fungus (*Colletotrichum gleosporioides*), closely allied to that causing the anthracnose of cotton. The fungus appears to be a wound parasite, gaining entrance into the fruit through wounds caused by wind, insects, etc. This disease has not, up to the present, been recorded as being present in the West Indies.

From the Department of Agriculture, Nairobi, a leaflet, No. 10, has been issued on the insect and fungoid pests reported during the year 1904-5. The larvae of a moth (*Spodoptera exempta*) destroyed the vegetation near Nairobi; a lady-bird (*Epilachna similis*) is mentioned as doing great damage to maize and wheat; and several beetles and other insects were observed. Amongst fungi, wheat-rust proved fatal to the prospects of the wheat crop, dwarf beans suffered from rust and anthracnose, and the crop of chick-pea (*Cicer arietinum*) was completely destroyed by a *uredo*-fungus. (*Nature*, February 15, 1906.)

The Barbados *Weekly Recorder* of March 10 discusses the situation in regard to cotton matters at Barbados as follows: 'We are pleased to learn that the cotton industry is in so flourishing a condition that the cotton factory cannot keep pace with the demands on it. The company are now face to face with the question of enlargement. More machinery is needed. The factory is too small. It is also badly situated. It is a clear case for a forward policy, and the company should lose no time in issuing fresh shares and raising the capital needed to meet the situation. The future of Barbados Sea Island cotton is assured, and so long as the commodity is kept up to its present degree of excellence, the Lancashire market will take as much of it as we can send to England, and give a good price for it. It is a paying crop, and there is no doubt the area of cultivation will increase considerably.'



AGRICULTURAL PRACTICES AND MORALS.

By E. J. Wortley. The Educational Supply Company, 16, King Street, Kingston, Jamaica.

Mr. E. J. Wortley, the Assistant Island Chemist of Jamaica, is to be congratulated on this manual. It is published in pamphlet form, and is intended to supplement, not to supersede, other books now in use by teachers and scholars on the subject of agriculture in the tropics. The book is written for the guidance of pupils of elementary schools, and to inculcate upon labourers and peasant proprietors those habits which tend towards thrift, industry, and intelligence. Its teaching is simple, direct, and forcible. Essential details are prominent. Its arrangement is orderly, and its mode of instruction intensely practical. Special attention is paid to those forms of agricultural abuses which are usually the outcome of laziness, or thoughtlessness, or lack of knowledge.

The book deals with the raising of a crop from the preparation of the soil to the reaping of the harvest, containing notes on the picking, the curing, and the sale and export of fruit. It also gives timely advice on the care and management of animals.

At the end, comes a page of *Agricultural Don'ts*, a series of short, pithy, practical bits of advice. These, according to the author's suggestions, might be transferred to a chart, and, if approved by the Board of Agriculture and Education Department, might be hung up in all public elementary schools.

QUARTERLY JOURNAL OF THE INSTITUTE OF COMMERCIAL RESEARCH IN THE TROPICS.

Liverpool University, Vol. I, No. I. Price 2s.

This is an excellent publication of an excellent society, to which reference has been made in another column.

The present issue, opening with departmental organization, gives the names as well as the duties of those responsible for its several departments of statistics, economic botany, economic zoology, and economic chemistry. The next division is that of laboratory reports, and under this are given the results of the investigations carried out under the departments of economic botany, zoology, and chemistry.

The journal also contains articles by various contributors, among them being a communication on the 'Osmotic Strength of Cell Sap in Plants growing under different conditions,' a note on 'Vascular Tissue,' a paper 'On the occurrence of a Poisonous Alkaloid in "West African Boxwood";' and a brief description of the economic products of the Solomon Islands.

At the end, comes an interesting section styled Museum Reports, wherein are described specimens and samples of all kinds of products derived from the vegetable kingdom, which have been contributed to the Museum of Economic Botany.

The journal is well printed, carefully arranged, and very instructive.

INQUIRY FOR WEST INDIAN PRODUCTS.

A firm in Liverpool, after a visit to the Colonial Exhibition in that city, writes as follows with regard to West Indian products:—

We have been for many years directly interested in the West Indian products, particularly cotton seed, and what is known as feeding stuffs. At present, we are getting large supplies of cotton seed from Porto Rico and other islands, and, as we think it likely that, owing to the great increase in the growth of cotton, there may be supplies of seed for disposal, we should esteem it a favour if you could put us in touch with the most likely houses in the various islands, with whom we might correspond.

We will either buy right out, or give them instructions to buy in unlimited quantities at certain limits to be fixed from time to time, or act as consignment agents on their account at this side. We are also buying cocoa-nut oil meal, and any other material that would be useful for feeding cattle, such as peas, beans, etc., and we shall be pleased to hear from you respecting the possibility of business in these articles.

COFFEE IN BRAZIL.

The *Hawaiian Forester and Agriculturist* for January last, contains the following interesting facts about the cultivation of coffee in Brazil:—

The state of Sao Paulo, Brazil, has 1,908,000 acres planted in coffee, and 4,585,000 acres of land suitable for coffee cultivation. There are 545,000,000 bearing trees, and 140,000,000 trees that will come into bearing within three years. The trees are worth \$312,000,000. The average yield per 1,000 trees is 2,300 lb. Four hundred and twenty thousand labourers are employed during the picking season.

The methods in use are entirely unlike the Hawaiian practice in coffee growing. The picking is deferred until the whole crop of cherries has ripened. The labourers then strip the cherry off the branches, allowing fruit, leaves, and twigs to fall on the ground. When the trees have been stripped, the fruit, with dirt, sticks, and stones is raked into heaps, shovelled into wagons, or cars on portable track, and transported to a river, stream, or flume, to be washed in sluice-boxes. These deliver the cherry free from sticks, stones, dirt, and rubbish. The cherry is then transported to huge, open-air, drying floors of cement or clay. The sun-dried cherry is run through hulling machinery, graded, and polished, and, when bagged, is ready for market.

Labour during the picking season commands high prices, and there is always a shortage at that time. The Sao Paulo method is well adapted to the needs of the small individual planter, who can market his coffee to the large planters and mill owners in the dried cherry. Practically, the only investment of capital, other than his own labour that is required, is the comparatively small cost of a drying floor.

This simplification of methods is responsible for the enormous over-development of the coffee industry of Brazil. Hundreds of thousands of European immigrants, German, Italian, and Portugese have poured into this salubrious, rich and well-watered region. Extraordinary inducements have been offered in the way of lands, prepaid ocean-transportation, loans to settlers, and, in some instances, guarantees of at least \$400 wages per annum. Road and railroad development has kept pace with the settlement of the land.



AGRICULTURE IN TRINIDAD.

There is much of interest to be found in the reports of the Wardens of the several districts, or ward unions, into which the island of Trinidad is divided. The following resumé of these reports, so far as they refer to agriculture, is taken from Council Paper No. 135 of 1905, which was laid before the Legislative Council of Trinidad on December 18, 1905:—

Taking **Arima** first, it is stated that lectures and demonstrations were given throughout the district by the Agricultural Instructors.

In the **Cedros** ward, the Warden reports favourably on the progress made in cultivation and general importance. He states, also, that an experimental ground was laid out on the lands of St. Marie plantation under the direction of the Botanical Department, with every promise of its being a success.

The Warden of **Mayaro** does not speak in favourable terms of the cacao cultivation in that ward union. The planting of it extends each year, but not on any well-ordered basis. Mr. Eccles adds: 'Nearly every one is a proprietor, and instead of labouring for his neighbour, wants labour himself. It is certainly a case of expanding without developing. Cacao plantations are certainly established in some way in the long run, but with no sound system of cultivation amongst the peasant proprietors. Thorough drainage is the principal factor in which they fail. They just depend on nature and help it as little as possible, which eventually results in producing a yield not a quarter of what should be produced.'

Following on this comes the announcement that the oil wells at Guayaguayare have been shut down for a long time. This is only temporary, it is hoped, for the development of this industry, in the opinion of the Warden, would make **Mayaro** an important locality.

Mr. Robert Johnstone, the Warden of **Naparima**, does not write in enthusiastic terms of the methods of cane cultivation practised by the farmers. He foresees disaster unless there is a cessation of the continued re-cropping without giving the soil rest, with more manuring, better drainage, and proper tillage. The farmers, he says, also plant their canes too far from the factories to grow them at a profit, considering that charges for transportation have to be paid. In some instances, canes are grown as far as 15 miles from the nearest factory.

Of rice, a better crop was raised this year than last, and were the Debe-Lagoon rice district drained in a serious and businesslike manner, the production, it is stated, would be prodigious, and capable of satisfying the requirements of the whole island. Both the corn and peas crops exceeded by far those of any previous year.

Of the **Oropuche** and **La Brea** ward union, the Warden reports that the fertile lands of the Coora Valley have attracted a large number of proprietors from other parts of the island to the district of Siparia, which, were the railway extended, would be one of the finest parts of the colony.

The pitch lake, with its inexhaustible supply of asphalt, is too well known to need comment here.

'On the south coast,' says Mr. Potter, 'is to be found in several places a hard sandstone which might make grind-

stones, or whetstones, and could be used in road making or perhaps as a building stone. The asphaltic sandstone at Guapo seems to be a natural sort of paving material and might be largely used as such, as it exists in almost inexhaustible quantities in the vicinity of the oil springs, and the porcellanite of La Brea Point is a recognized substance for road making.'

There are 8,500 acres under cacao cultivation, or 500 acres more than last year. Even with East Indian settlements, rice cultivation is giving way to cacao, where there is a possibility of draining off the water.

The cultivation of cocoa-nuts has not increased in the ward union, although the industry is remunerative.

With regard to cotton, its cultivation has been seriously retarded by the appearance of the boll disease.

The Warden hints at a possibility of establishing, in the near future, fruit farms in the district, its lands being eminently adapted for the purpose. Oranges, limes, bananas, and pine-apples are easily grown, and yield crops without anything like proper cultivation.

Mr. H. C. Warner, the Warden of the **Savana Grande** district, writes as follows under the head of Agricultural Stations: 'I am still of opinion that there should be at least two sub-stations of the Agricultural Department in the agricultural districts of the colony as important object-lessons to peasantry, and from whence valuable economic plants could be distributed and sold with far greater facility than at present. These sub-stations should be under the charge of the Agricultural Instructors (assisted by a local or district Agricultural Board) and should be the starting point from which these gentlemen should proceed on their visits of inspection to school gardens, etc.'

Concerning the Botanical Station in **Tobago**, Mr. Rousseau the Warden, writes that the facilities it offers are much appreciated and taken advantage of by the people. 'The farm,' he says, 'has suffered greatly from drought. The stock are, however, in fine condition, and efforts are being made to induce the people to take more advantage of the opportunity afforded them of improving the breed of stock in the island.'

The cacao industry has been disappointing, owing to the failure of the crop at the end of last year, in which Trinidad also suffered. He concludes his report with the following remarks: 'The general condition of the island continues to improve. There is more money in circulation, fresh lands are being cultivated, and a better class of houses being erected by the peasantry.'

'On several abandoned sugar estates cultivation is being renewed. That of cacao and rubber is being extended, and efforts are being made to introduce the cultivation of Sea Island cotton for which the lands in the southern portion of the island are particularly suited.'

Reports of Parish Inspectors of Trees. Among the documents presented to the House of Assembly and published in the *Official Gazette* of Barbados for February 26, 1906, are the Reports of the Inspectors of Trees for the parishes of St. John, St. Michael, St. Peter, and St. Joseph. The first-named parish has 156 acres planted in trees of the following varieties: mahogany, white-wood, grape, bearded fig, fiddle-wood, and manchineel. In St. Michael's parish, the trees growing on Welches, Kingston, the Lodge plantation, Warrens, and Waterford cover, in all, an area of 34 acres; and include, among others, the cordia, cassuarina, Spanish ash, ebony, sand-box, and some fruit trees. St. Peter's parish has 92 acres, and St. Joseph's parish 77 acres under tree cultivation.

WEST INDIAN PRODUCTS.

Drugs and Spices in the London Market.

The following report on the London drug and spice market for the month of January 1906, has been received from Mr. J. R. Jackson, A.L.S.:—

Notwithstanding the disturbing influences of the general election following on Christmas holidays, and the stock-taking season, the Mincing Lane trade in drugs and spices has shown a distinct improvement since our last report. The greatest activity was experienced about the middle of the month. Of individual drugs, Cinchona barks and camphor have perhaps occupied most attention; the first, on account of the large quantities coming forward and already in stock, amounting, it is said, to so large a quantity as to be sufficient to meet the world's requirements for at least seven months; and the second, on account of a deficiency of the crude material, due to the late war in the Far East. The following notes refer chiefly to West Indian products:—

GINGER.

At the first sale on January 3, no Jamaica was offered, but of other kinds the following were the quotations: Fair washed Cochin, 23s. to 26s., and Calicut 25s. At these rates, it was reported that a good business had been done privately; some 3,000 packages having been disposed of. Japan was sold on the spot at 18s. 6d. to 19s. per cwt. A week later, viz., on the 10th., ginger was very much to the fore at the spice sales. Jamaica being again absent, Cochin and Calicut were offered to the extent of 767 packages, and a small quantity was disposed of at the following rates: Bold and medium Cochin, 76s.; good medium, 60s. to 61s.; small native medium cut, 42s. to 50s.; small to fair washed was bought in at 26s. to 29s. Fair lined Japanese was also bought in at 23s. Washed rough Cochin was quoted at 26s. to 27s. per cwt. On the 17th., a few sales were made at 45s. to 46s. of ordinary to good ordinary small Jamaica: of 27 barrels offered, 14 were disposed of at these rates, while out of 1,000 packages of Cochin and Calicut offered, about one-half were sold: bold rough Calicut fetching 35s., fair washed rough Cochin 29s., and fair ordinary 26s. Good plump Japan was bought in at 26s. At the concluding auctions on the 24th. and 31st., the ginger sales were very firm: 80 bags of Jamaica were offered on the first date and all bought in, and 725 packages of Cochin and Calicut were also offered and firmly held, and on the last date the offerings of all kinds were bought in.

It was stated on the 24th., with reference to the new Jamaica crops, that no reports had, up to that time, arrived concerning them; from which it was inferred that their arrival would be late in the market.

NUTMEGS, MACE, AND PIMENTO.

The supply of nutmegs throughout the month was small, and the demand quiet. At the spice auctions on the 10th., the prices were $\frac{1}{2}$ d. per lb. lower than in the previous month for West Indian, and 1d. per lb. lower for Singapore, at which rates they remained for the rest of the month. The business in mace was also of a quiet character, with a slightly dearer tendency both for West Indian and Penang. On the 10th. some 52 packages of West Indian were offered, and sold at the following rates: Good, 1s. 6d. to 1s. 7d.; fair, 1s. 4d. to 1s. 5d.; ordinary, 1s. 3d.; new pickings, 1s. to 1s. 2d. A week later, the only kind offered was wild Bombay, of fair brownish quality, which fetched $2\frac{1}{2}$ d. per lb.

With regard to pimento, the sales were very steady throughout the month at $2\frac{3}{4}$ d. per lb. A large supply was offered on the 10th., the bulk of which was held at $2\frac{7}{8}$ d.

ARROWROOT.

At the first spice sale on the 10th., 597 packages of St. Vincent were offered, of which 20 were sold at 3d. per lb. for good manufacturing. Some 20 cases of fine Natal were also offered, and bought in at $4\frac{1}{2}$ d. A slight advance from 2d. to $2\frac{1}{2}$ d. was asked for the same quality St. Vincent a week later, which prices remained steady till the end of the month, with the exception that on the 24th., 3 dozen tins of good St. Vincent were offered, and sold at 3d. per lb.

SARSAPARILLA.

Of this drug, in which little interest has been shown until the auction on the 18th., dearer rates have been obtained, and at the auction, 5 bales of genuine grey Jamaica fetched 1s. 8d. per lb. Nineteen bales of native Jamaica, partly sea-damaged, realized 7d. to $11\frac{1}{2}$ d. Pale yellow, of which 3 bales were offered, fetched 9d. to $9\frac{3}{4}$ d.; 2 bales of fine red fetched 1s., and fair Lima Jamaica was sold at 1s. 3d. to 1s. 4d. Everything indicated, towards the close of the month, a further advance in prices.

KOLA NUTS, LIME JUICE, OIL OF LIMES, ORANGE PEEL AND CHILLIES.

Of other West Indian products, some bright Jamaica kolas were offered, and sold at from 3d. to $3\frac{1}{4}$ d. per lb. In the same week, 5 puncheons of common raw lime juice were disposed of without reserve at 6d. per gallon, and 2 cases of fair West Indian distilled oil of lime at 1s. 5d. Good, bright thin strip, orange peel has fetched 8d. per lb. Good Nyasaland chillies have sold at 32s., while fair Zanzibar were bought in at 35s., and mixed yellowish Mombasa at 30s.

AGRICULTURAL PROSPECTS IN JAMAICA.

In his annual charge to the Synod of the Diocese of Jamaica, quoted in the *Gleaner* of February 8, 1906, the Archbishop of the West Indies speaks in forcible terms about the agricultural needs and developments of the islands. His Grace defines his own position with regard to the subject as follows:—

I have never felt it necessary to apologize for taking an active interest in secular work, for I consider that everything tending to promote the material as well as the moral interests of the people, generally, is properly within the sphere of the activities of a christian bishop.

In the course of his remarks, Dr. Nuttall goes on to say that various agencies of a public and individual character are now actively at work. Many of the older people have already become interested in the new agricultural methods, and are carrying them out in practice; and energetic young men of various grades in life are likewise interested and informed, and are beginning to make practical application of their knowledge.

The Archbishop concludes by stating that the agricultural progress of Jamaica is assured if all available knowledge, skill and labour, are used for steadily increasing the number, the quantity, and the quality of the products put forth; for improving the methods in which they are prepared for the market; and for securing their safe and quick transit, and the honest disposal of them in British, American, and other markets.

MARKET REPORTS.

London,—February 16, 1906. Messrs. KEARTON, PIPER & Co.; Messrs. E. A. DE PASS & Co.; 'THE WEST INDIA COMMITTEE CIRCULAR,'; 'THE LIVERPOOL COTTON ASSOCIATION WEEKLY CIRCULAR,' February 9; and 'THE PUBLIC LEDGER,' February 10, 1906.

ALOES—Barbados, 15/- to 60/-; Curacao, 17/- to 60/- per cwt.
ARROWROOT—St. Vincent, 2d. per lb.
BALATA—Sheet, 1/4 to 1/11; block, 1/4 to 1/4½ per lb.
BEES' WAX—£7 10s. to £7 12s. 6d. per cwt.
CACAO—Trinidad, 52/- to 60/- per cwt.; Grenada, 47/- to 51/- per cwt.
CARDAMOMS—Mysore, 7½d. to 3/- per lb.
COFFEE—Jamaica, good ordinary, 38/- to 40/- per cwt.
COTTON—West Indian, medium fine, 6/40d.; West Indian Sea Island, medium fine, 13d.; fine, 14d.; extra fine, 15½d.; Barbados Sea Island, 15d. to 17d. per lb.
FRUIT—
BANANAS—Jamaica, 4/6 to 7/- per bunch.
GRAPE FRUIT—6/- to 7/- per box.
LIMES—No quotations.
ORANGES—Jamaica, 5/- to 8/- per box of 176-200.
FUSTIC—£3 5s. to £4 per ton.
GINGER—Jamaica, 48/- to 56/- per cwt.
HONEY—Dark, 16/-; brown set, 17/6 to 18/-; greyish white set, 23/6 to 25/- per cwt.
ISINGLASS—West Indian lump, 2/1 to 2/4; cake, 1/1 to 1/2 per lb.
KOLA NUTS—4d. to 6d. per lb.
LIME JUICE—Raw, 10d. to 1/1 per gallon; concentrated, £16 10s. per cask of 108 gallons; hand-pressed, 2/3 to 2/6 per lb. Distilled Oil, 1/5 per lb.
LOGWOOD—£4 to £4 15s.; roots, £3 10s. to £4 per ton.
MACE—Good bold pale, 1/6 to 1/8; good red, 1/4; broken, 1/1 to 1/3 per lb.
NITRATE OF SODA—Agricultural, £11 5s. per ton.
NUTMEGS—65's, 1/2; 72's, 10d.; 80's, 9d.; 96's, 6½; 108's, 5¾d.; 135's, 5d. per lb.
PIMENTO—Fair, 2½d. to 2¾d. per lb.
RUM—No quotations.
SUGAR—Yellow crystals, 13/6 to 17/- per cwt.; Muscovado, 15/- to 15/6 per cwt.; Molasses, 10/6 to 14/- per cwt.
SULPHATE OF AMMONIA—£12 12s. 6d. per ton.

Montreal,—January 18, 1906.—Mr. J. RUSSELL MURRAY. (In bond quotations, c. & f.)

COCOA-NUTS—Jamaica, \$27.00 to \$29.00; Trinidad, \$25.00 to \$26.00 per M.
COFFEE—Jamaica, medium, 10c. to 11c. per lb.
GINGER—Jamaica, unbleached, 7½c. to 10c. per lb.
MOLASCUIT—Demerara, \$1.00 per 100 lb.
MOLASSES—Barbados, 29c. to 30c.; Antigua, 24c. per Imperial gallon.
NUTMEGS—Grenada, 110's, 18c. per lb.
ORANGES—No quotations.
PIMENTO—Jamaica, 5¼c. per lb.
SUGAR—Grey crystals, 96°, \$2.00 to \$2.15 per 100 lb.
 —Muscovados, 89°, \$1.50 to \$1.65 per 100 lb.
 —Molasses, 89°, \$1.35 to \$1.50 per 100 lb.
 —Barbados, 89°, \$1.45 to \$1.70 per 100 lb.

New York,—February 16, 1906.—Messrs. GILLESPIE BROS. & Co.

CACAO—Caracas, 11½c. to 12½c.; Grenada, 10c. to 10½c.; Trinidad, 11c. to 11½c.; Jamaica 9¼c. to 9½c. per lb.
COCOA-NUTS—Jamaica, \$25.00 to \$27.00; Trinidad, \$24.00 to \$25.00 per M.
COFFEE—Jamaica ordinary, 8¼c. to 8¾c.; good ordinary, 8¾c. to 9¼c. per lb.
GINGER—Jamaica, 7½c. to 9¾c. per lb.
GOAT SKINS—Barbados, Dominica, and Antigua, 58c. to 60c.; Jamaica, 61½c.; St. Kitt's, 51c. per lb.

GRAPE FRUIT—Jamaica, \$6.00 to \$8.00 per barrel; \$3.50 to \$4.00 per box.
MACE—28½c. to 31½c. per lb.
NUTMEGS—West Indian, 80's, 22½c. 90's, 18½c.; 100's, 17c.; 110's, 14c. per lb.
ORANGES—Jamaica, \$4.00 to \$4.50 per barrel; \$2.50 to \$3.50 per box.
PIMENTO—4¾c. per lb.
PINE-APPLES—No quotations.
SUGAR—Centrifugals, 96°, 3¾c.; Muscovados, 89°, 2¾c. Molasses, 89°, 2½c. per lb.

INTER-COLONIAL MARKETS.

Barbados,—March 10, 1906.—Messrs. T. S. GARRAWAY & Co., and Messrs. JAMES A. LYNCH & Co., March 8, 1906.

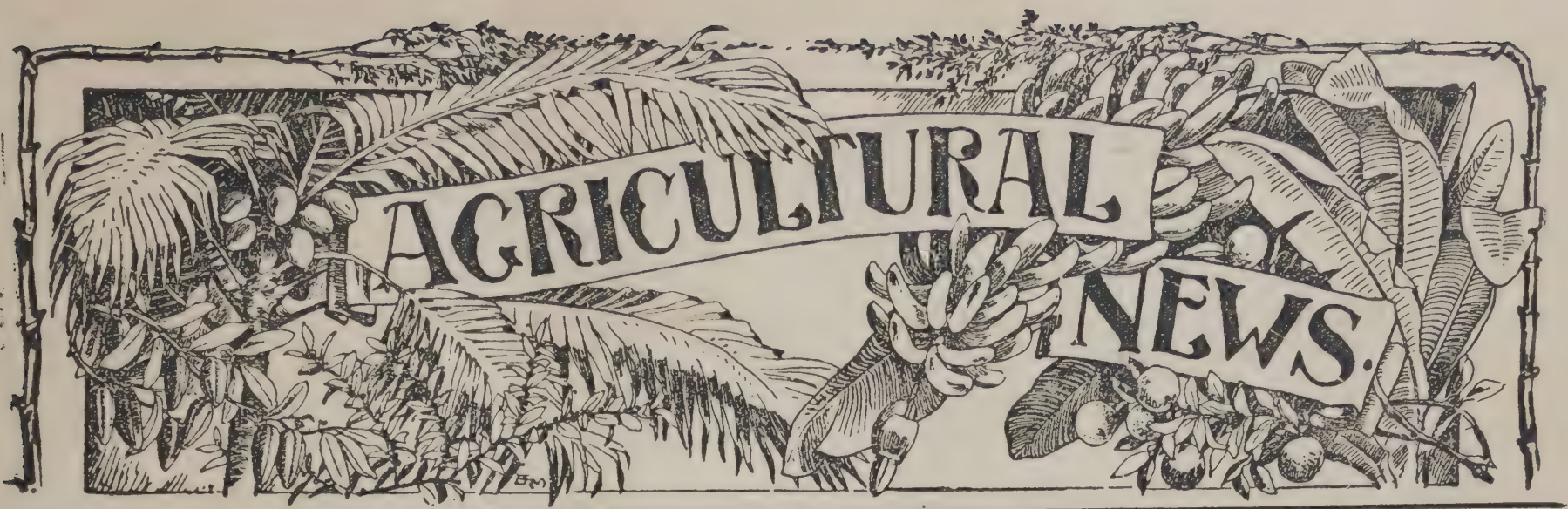
ARROWROOT—St. Vincent, \$3.80 to \$4.25 per 100 lb.
CACAO—\$10.50 per 100 lb.
COCOA-NUTS—\$10.00 per M. for husked nuts.
COFFEE—\$10.50 to \$11.75 per 100 lb.
HAY—95c. to \$1.00 per 100 lb.
MANURES—Nitrate of soda, \$65.00; Ohlendorff's dissolved guano, \$55.00; Cotton manure, \$48.00; Sulphate of ammonia, \$75.00; Sulphate of potash, \$67.00 per ton.
MOLASSES—14c. to 15c. per gallon.
ONIONS—Lisbon, \$3.50 to \$4.00 per 100 lb.
POTATOS, ENGLISH—Nova Scotia, \$2.25 to \$3.00 per 160 lb.
RICE—Ballam, \$4.40 to \$4.70 per bag (190 lb.); Patna, \$2.86 to \$3.25; Rangoon, \$2.50 to \$2.75 per 100 lb.
SUGAR—Muscovados, 89°, \$1.35; Dark crystals, 96°, \$1.75 per 100 lb.

British Guiana,—February 28, 1906.—Messrs. WIETING & RICHTER.

ARROWROOT—St. Vincent, \$8.00 per barrel.
BALATA—Venezuela block, 25c.; Demerara sheet, 38c. per lb.
CACAO—Native, 13c. to 14c. per lb.
CASSAVA STARCH—\$4.00 per barrel.
COCOA-NUTS—\$10.00 to \$12.00 per M.
COFFEE—13½c. to 13¾c. per lb.
DHAL—\$5.25 to \$5.40 per bag of 168 lb.
EDDOES—84c. to \$1.20 per barrel.
ONIONS—Lisbon, 4c. per lb. (ex store).
PLANTAINS—20c. to 40c. per bunch.
POTATOS, ENGLISH—\$2.00 to \$2.50 per barrel.
POTATOS, SWEET—Barbados, \$1.20 per bag.
RICE—Ballam, \$4.80 to \$4.90 per 177 lb.; Creole, \$4.25 per bag (ex store).
SPLIT PEAS—\$5.60 per bag (210 lb.).
TANNIAS—\$1.44 per barrel.
YAMS—White, \$1.80; Buck, \$2.40 per bag.
SUGAR—Dark crystals, \$1.80 to \$1.90; Yellow, \$2.30 to \$2.40; White, \$3.20 to \$3.25; Molasses, \$1.70 to \$1.80 per 100 lb. (retail).
TIMBER—Greenheart, 32c. to 55c. per cubic foot.
WALLABA SHINGLES—\$3.00, \$3.75, and \$5.25 per M.

Trinidad,—March 6, 1906.—Messrs. GORDON, GRANT & Co.; and Messrs. EDGAR TRIPP & Co.

CACAO—Ordinary to good red, \$11.00 to \$11.25; estates, \$11.50 to \$11.60 per fanega (110 lb.); Venezuelan, \$11.60 to \$12.00 per fanega.
COCOA-NUTS—\$20.00 per M., f.o.b.
COCOA-NUT OIL—70c. per Imperial gallon (casks included).
COPRA—\$3.10 to \$3.25 per 100 lb.
DHAL—\$4.50 to \$4.80 per 2-bushel bag.
MOLASSES—15c. per gallon.
ONIONS—\$2.00 to \$2.50 per 100 lb. (retail).
POTATOS, ENGLISH—\$1.20 to \$1.50 per 100 lb.
RICE—Yellow, \$4.75 to \$5.10; White, \$5.00 to \$5.90 per bag.
SPLIT PEAS—\$5.00 to \$5.25 per bag.
SUGAR—Yellow crystals, \$2.00 to \$2.25; molasses; \$1.50 to \$1.75 per 100 lb.



A FORTNIGHTLY REVIEW OF THE

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seed obtained from healthy plants that have given a good yield per acre, and that have produced lint which has fetched the highest price during the current season. The experience of a successful cotton grower is :—The selection of seed is the one thing that cannot be overlooked.

As it will be impossible to obtain further supplies of seed from the Sea Islands, the West Indies have to depend on their own resources. This is not a difficult matter, provided growers realize the necessity of making the selection of seed a matter of the first importance. They should be prepared to take some trouble in making themselves acquainted with the subject, and in carrying out for themselves the process of seed selection, or they should be prepared to pay a reasonable price for selected seed. Seed of inferior quality should not be planted on any account. The difference in cost between good seed and inferior seed is a small matter as compared with the difference in the price realized for the crop.

The general lines on which cotton growers are recommended to make a choice of cotton seed for planting during the coming season are these: First, the plants from which it has been obtained should be thoroughly healthy, and they should not have suffered severely at any time from the cotton worm or other pests. The next point is to ascertain that the plants are of good habit and are prolific, yielding, on an average, say, not less than 200 lb. of lint per acre. The third point, and perhaps the most important of all, is that the plants have yielded lint that has obtained the highest prices during the current year.

As already stated, the Imperial Department of Agriculture has undertaken a series of experiments in

Selected Cotton Seed for 1906.

It is recognized that the most important matter requiring attention, in order to maintain the high quality of the Sea Island cotton produced in the West Indies, is to plant

seed selection that are likely to prove of great value to the industry. These experiments are intended to cover the careful selection of seed, on field results, for immediate planting, as well as the systematic selection of improved seed from individual plants, as described in the *Agricultural News* (Vol. V, p. 38), for future years.

It has been abundantly proved by general experience both in the Sea Islands and in the West Indies, that it is impossible to obtain first-class cotton from inferior seed. In Egypt, also, the importance of selecting good seed is fully recognized. Mr. Foaden states:— 'Of all plants, cotton responds the most liberally, as far as both yield and quality are concerned, to careful treatment, and the sowing of good seed is the very first essential to the production of good stapled cotton. However carefully our land may be prepared and manured, the production of superior cotton from inferior and mixed seed is an impossibility.' Further, there is the opinion of the British Cotton-growing Association, as follows: 'The bulk of the cotton from the West Indies is turning out very well, but you must impress on all the growers the necessity for *very careful selection of seed*, and extreme care in cultivation and handling, for unless Sea Island cotton is quite right in all respects, it suffers severely in price.'

As announced in the columns of the *Agricultural News* (Vol. V, p. 89), the Imperial Department of Agriculture is prepared to supply specially selected and disinfected cotton seed for planting during the months of May to August next, and to deliver the seed at any port in the West Indies at the rate of five cents (2½d.) per lb. Applications for such seed will be received by the principal agricultural officers in each island, as follows: For Antigua and Montserrat, by the Hon. Francis Watts, C.M.G.; for St. Kitt's, Nevis, and Anguilla, by Mr. F. R. Shepherd; for Barbados, by Mr. J. R. Bovell, F.L.S., F.C.S.; for St. Vincent, by Mr. W. N. Sands. Applications from Jamaica, British Guiana, Trinidad, and other colonies not mentioned above, may be forwarded direct to the Imperial Commissioner of Agriculture, Head Office, Barbados. All applications will be dealt with in the order in which they are received.

In order to prevent disappointment in regard to the germinating qualities of the seed, it is recommended that immediately on its arrival it be turned out of the bags or barrels, in which it is packed, and spread out on a dry floor in order that any excess of moisture may be removed. After the lapse of a day or two, the seed may be replaced in the bags or barrels, and kept until it is planted.

It is also recommended that about 100 seeds, taken from the bulk, be sown in soil, or placed between folds of damp cloth, as described in the *Agricultural News* (Vol. II, p. 153), in order to test its germinating power. In the event of doubt arising as to the condition of any selected cotton seed received from the Imperial Department of Agriculture, a sample of not less than 100 seeds should be forwarded within seven days from the date of the arrival of the seed, to the agricultural officer through whom it was ordered, in order that it may be carefully tested. It should be borne in mind that the best results are likely to be obtained when the selected cotton seed is sown within a period of one month after it has been received.

LIME JUICE AND OIL IN DOMINICA.

The following extract from a letter of Messrs. Harvey, Lockie & Co., 16, Mincing Lane, London, E.C., to the Curator of the Botanic Station, Dominica, with regard to the trade in concentrated lime juice, should be of interest. The table following shows the amounts and value of the exports of concentrated and raw lime juice and lime oil for the four years 1902-5 inclusive:—

We are glad to note that the exports of concentrated lime juice are increasing, and hope that, during this year, the increase will be even greater, as the prices both in England and America will be considerably higher even than last year, so that there will always be a ready market for West Indian lime juice. It is very important that shipments of concentrated juice be made *earliest possible*, so as to come in before the new crop in Sicily, which begins to arrive in London in December. The production of concentrated juice in Dominica is equal to 1,700 Sicilian pipes of 108 gallons, of 642 citric acid per gallon. The Sicilian crop is 15,000 to 20,000 pipes, so there is room for a much larger supply from Dominica.

Year.	Concentrated lime juice.		Raw lime juice.		Essential oils.	
	Gallons.	Value.	Gallons.	Value.	Gallons.	Value.
		£		£		£
1902	136,346	29,016	263,915	9,877	5,729	3,729
1903	66,704	14,175	129,316	4,849	3,063	1,509
1904	83,727	17,792	234,972	6,853	2,808	1,165
1905	124,765	26,513	164,468	4,229	4,228	1,733
Total	411,542	87,496	792,671	25,808	15,828	8,136

APPOINTMENT VACANT.

The post of Agricultural Instructor, under the Imperial Department of Agriculture, is vacant at Dominica. Candidates should be not more than thirty years of age, active, accustomed to ride, and with good experience in practical agriculture, especially cacao planting. Salary £130 per annum, quarters free, with £20 for horse allowance, and a small personal allowance when travelling on duty. Applications, with full particulars as to age and experience, to be addressed to—

The Imperial Commissioner of Agriculture, Head Office, Barbados.

SUGAR INDUSTRY.

The Economics of the Sugar Industry.

Under this title there appears in the *Louisiana Planter* for March 3, 1906, an instructive article from which the following extracts are taken. The writer, in prefacing his remarks, draws attention to the fact, that there is no industry to which more labour-saving devices have been offered, than that of sugar; but that, in the face of keen competition there is need of still further development. He says:—

One direction in which we of the cane sugar world are sadly deficient, is in the economic utilization of the by-products of our industry. Paper making from bagasse has not yet been made an industrial success. The hundreds of thousands of tons of cane tops annually left in our fields have not yet been successfully utilized as stock feed, and the many thousands of tons of common molasses that we annually produce have not yet been converted to anything like their proper value for stock feeding, or for the production of alcohol.

The German beet sugar producers can teach us some lessons in sugar economics that may have great value. The leaves and tops of the beets are regarded as valuable for stock feeding, realizing from \$4.25 to \$5.25 per acre to the producer.

The beet factories have also been endeavouring to utilize their molasses for stock feeding. This is a much more difficult problem with them than it is in the cane sugar world, as cane molasses, being so much better flavoured, and so free from alkaline salts, is consumed eagerly by nearly all kinds of animals. Beet molasses, however, has commanded a very considerable market by its use in the manufacture of alcohol, a trade that we hope will also reach our cane molasses.

We note now that even the lime from the beet sugar factories is being sold as a fertilizer, while we in the cane sugar world, or some of us, are throwing away our filter press cakes that have a high fertilizing value. If we are successfully to withstand the severe, old-fashioned competition that comes to us from the manufacturers of central Europe, who are practising the extremest economy in the cause of the manufacture of sugar, and are securing the very highest order of results in the way of yield, we must unquestionably imitate them, and practise like economies, in order to secure comparatively equal effectiveness in the way of results.

The Food Value of Sugar.

In the *Louisiana Planter* for March 3, last, there is a brief note on 'Sugar considered as an article of food.' It has reference to the researches in this direction of Dr. Lee, Professor of Physiology at Columbia University:—

He claims that fatigue is a result of certain chemical changes in the body due to muscular exertion. Sugar taken internally arrests and prevents these changes. The sugar replenishes the carbohydrates that are wasted by exertion, and causes the fatigue due to this waste to disappear. On this account, Dr. Lee incidentally says to his friends that when they go for a long tramp, they must not bother about carrying a lunch, but, with half a dozen lumps of sugar in their pockets, they can eat them when they get tired or hungry, and will at once find their strength and freshness renewed.

Men and mules are a good deal alike when it comes to getting tired, and the quick rendezvous at the molasses tank of the working stock after a hard day's work, shows the keen discrimination and high appreciation of our humble confrère in the sugar business, the mule, without whose aid our industry would be seriously crippled.

Seedling Sugar-canes in British Guiana.

In continuation of the statement published in the *Agricultural News* (Vol. IV, p. 242), giving the comparative results of the cultivation of seedling canes as compared with Bourbon canes on plantation Diamond, British Guiana, Mr. John Fleming, the manager, has been good enough to supply complete returns for the year 1905, as follows:—

Canes.	Acreage.	Tons of sugar.	Average returns per acre.
Seedlings ...	2,242.162	6,997	3.12
Mixed varieties	286.092	796	2.78
Bourbon ...	3,056.130	7,207	2.35
Total ...	5,584.384	15,000	2.68
Seedlings better by 33 per cent.			

In the previous four years the seedlings were better than the Bourbon in 1901, by 29 per cent.; in 1902, by 21 per cent.; in 1903, by 14 per cent.; and in 1904, by 31 per cent. If to this is added the return for 1905, viz., 33 per cent., the average superiority of seedling canes over the Bourbon cane on plantation Diamond, over a period of five years, is at the rate of 25.6 per cent.

This is conclusive as showing that, under the conditions existing at Diamond, seedling canes tested over a period of five years and on an area of over 2,000 acres, give nearly 26 per cent. more sugar than the Bourbon.

Another use for Molasses.

The *Louisiana Planter* for February 17 last, contains the following note on using molasses in the manufacture of briquettes:—

We have sometimes urged in this journal that the greatest relief the sugar industry can hope for is that of such a rapidly increasing consumption as to hold prices where they are. There is no use of our expecting that the farmers on the great plains of central Europe are going back to the culture of wheat, barley, rye, and oats, in which they have been engaged for hundreds of years, when the nineteenth century demonstrated to them so thoroughly that they could do better with beet culture; and that with the advent of beet culture on those plains, the civilization of their people has risen to a far higher standard than the most sanguine expected a half-century ago.

It becomes us, then, to endeavour in every direction to increase the consumption of sugar, and we notice now that the French journal *La Nature*, reports that molasses has been successfully used to make up coal dust into briquettes. The molasses is utilized in the proportion of 1 to 1.5 per cent., and in warm weather a little linseed oil is added to counteract the tendency to absorb moisture, that has been shown by briquettes thus prepared.



WEST INDIAN FRUIT.

A SUPERIOR ORANGE.

The following information has been received from Sir W. T. Thiselton-Dyer, K.C.M.G., with regard to a superior orange known amongst the Chinese, as 'Tim Kom.' This is described in the Hong Kong Report for 1886 as follows:—

I inspected plantations of the orange which Mr. Henry mentions in *Ling-Nam*. It is known by the name 'Tim Kom.' No orange which I have tasted in China equals it for sweetness; it is also very juicy and of a fine flavour. Amongst the foreign community, I believe this orange is not so well known as it deserves to be. It has a high market value, the price in Hong Kong being 13c. per lb.

COOL STORAGE FOR FRUIT.

The following information respecting the facilities offered by the Royal Mail Steam Packet Company for carrying fresh tropical fruit between the West Indies and the United Kingdom will be of interest:—

We have the pleasure to inform you that under date March 3, last, we are informed by the company that the installation of Hall's system of cool storage for carrying fruit on board the 'Tagus,' 'Trent,' 'Atrato,' and 'Orinoco' is now completed.

With regard to the S.S. 'La Plata,' we are informed that the work of insulating this vessel would be commenced immediately on her arrival in England, and will be completed on her next return.

TOMATOS IN CUBA.

Information as to the efforts that are being made to increase the cultivation of tomatos in Cuba is given in Bulletin No. 4 of the Central Station of Agriculture:—

Already in a few sections, the growing of tomatos for exportation to the United States is becoming the leading industry for the winter months. Some good varieties have been introduced, and, wherever grown on a commercial scale, have proved profitable.

The length of time required, from the sowing of the seed until the tomatos begin to ripen, seems to vary with the variety, the season of the year, and the soil.

Seed should be sown early in September, if the tomatos are wanted for the Christmas market. It is sown thickly in well-prepared beds. When the plants are about 2 inches high, they are transplanted into other beds, where they are carefully shaded from the direct sun, and watered. When they reach a height of from 8 to 10 inches, they can be planted into their permanent positions.

Extensive experiments have been carried out at the Experiment Station with artificial manures, and with different varieties with the view of testing their productiveness. Four varieties produced excellent results, under the conditions prevailing in Cuba, and their yields were estimated as ranging from 10,128 lb. to 17,533 lb. per acre.

Tomatos seem likely to prove a profitable crop in Cuba, and there is no reason why the growing of this fruit should not prove a profitable minor industry to many of the West Indian Islands, other than Cuba, provided that good varieties are carefully cultivated, and that shipping facilities to the United States could be obtained.

HINTS ON ORANGE CULTIVATION.

In the *Jamaica Gleaner* for February 1, 1906, the following suggestions for promoting the earlier ripening of oranges are embodied in a letter to the Colonial Secretary from the Director of Public Gardens and Plantations:—

- (1) Removal of all fruit late in October or early in November.
- (2) Removal at the same time from the trees of all dead wood, lichens, moss, and other growths—this, of course, should be also done throughout the year.
- (3) Opening up the main roots for 1 foot or 18 inches from the stem, and removing the soil from them.
- (4) Application of lime on surface of ground from stem as far as branches extend; all the above work to be finished during November.
- (5) Forking up the soil in December for a breadth of 1 foot all round the tree just outside the extremities of the root-system, and application of wood-ashes, bones, and a little well-rotted pen manure to it, or the equivalent in commercial fertilizers.
- (6) Maintaining a mulch of grass, etc., from January until the fruit is full, and then removing it.
- (7) Irrigation, whenever possible, by using waste water, etc., during the same months that the mulch is used.
- (8) Thinning out the fruit by one-half, when they are about the size of marbles.

AGRICULTURAL SHOWS.

St. Vincent Agricultural Show.

The following is taken from an account of the agricultural show at St. Vincent, on March 7, contributed by Mr. W. N. Sands, Agricultural Superintendent:—

The third annual agricultural show, under the auspices of the Imperial Department of Agriculture, and the Agricultural and Commercial Society, was held at the Agricultural School, on March 7. The exhibits, as a whole, showed a high standard of excellence, although the entries were not so numerous as last year.

The stock exhibited formed a feature of the show. In the poultry classes there was very keen competition; the exhibits of fowls were especially good, and showed that the efforts made by the Department in introducing improved breeds of fowls were meeting with success. The pens of pure-bred fowls, belonging to the Agricultural School, were exhibited, together with a number of pure-bred chickens raised from them. Considerable attention was attracted by the fine lot of Indian game fowls also exhibited by the Agricultural School.

A sample of 'Angora wool' sheared from one of the Angora goats raised on Ratho-Mill estate, appeared to be of good quality, clean, and bright, and proved of great interest to visitors.

In the classes for estate products, competition was good, and the exhibits of cacao, arrowroot, cotton, cassava starch, nutmegs, and coffee showed much improvement. A sample of Queensbury cacao beans, which was awarded the first prize, demands special mention as being the best sample from a commercial point of view. Other samples of cacao showed that more attention should be given to preparation for market, especially in the matter of curing. Some very good samples of Arabian coffee were shown. An exhibit of Mt. Bentinck starch won the first prize for arrowroot in a class where the competition was very keen.

Seventeen commercial samples of Sea Island cotton were on exhibition in competition for the silver medals offered by Sir Alfred Jones, all of which appeared to be of first-class quality. These exhibits will be judged by the Imperial Department of Agriculture at Barbados. Other exhibits in this section deserving notice, were samples of cured vanilla beans, kola, and *Stenophylla* coffee. Each was well prepared, and would form a good marketable product.

In the fruit and vegetable sections, the bananas and plantains were very fine. The prize bunch of bananas was a splendid one of twelve hands, for which a Diploma of Merit was awarded. Two exhibits of white pigeon peas were awarded equal first prizes. These exhibits deserve attention as being the nearest approach, from a culinary point of view, to English peas. A supply of these peas will again be distributed by the Department to be grown in each of the other islands, in order to encourage their cultivation generally.

In the section for miscellaneous exhibits, a very instructive exhibit of comb and extracted honey and bees'-wax, from the Albert Park apiary, was awarded a Diploma of Merit. The honey was well prepared, clear and bright, and demonstrated the reason why St. Vincent honey is fetching such good prices in the English market.

The school exhibits were very poor, and only the Troumaka school, of which Mr. W. Clarke is teacher, showed a creditable lot of plants and vegetables grown in the school gardens. It is to be regretted that more interest is not shown

in teaching agriculture in the elementary schools of the island.

The Imperial Commissioner of Agriculture and the Administrator visited the exhibition during the day, and closely inspected the exhibits. They also addressed the large gathering of people on the objects of agricultural shows, and on matters of agricultural interest to the island generally. The Imperial Commissioner personally awarded Diplomas of Merit to those exhibitors whose exhibits were of special interest and value. Taken altogether the show was a success. The attendance was large, the weather fine, and the exhibits of good quality.

AGRICULTURAL TRAINING.

On p. 95 of the present volume of the *Agricultural News*, will be found some remarks made by the Archbishop of the West Indies on the subject of agricultural prospects in Jamaica. It might be of interest to quote from the *Antigua Standard* of February 10, 1906, the following observations by the Bishop of Antigua in his first charge to the Synod, on the subject of agricultural training:—

I shall be pleased if, before the Synod closes, you will give me some idea of the condition of things in your schools, more especially with regard to agricultural training. There is, I understand, a good deal of quiet work in the way of agricultural education going on in these islands, which is slowly but surely altering the tone of thought for the better, with respect to the whole matter. But there is, I find, a feeling on the part of some who have knowledge of such things, that neither its change nor its importance is recognized by some of us. Hence the desire which I have expressed. Possibly, the interest which I feel in this subject may rouse the interest of those who have not yet had the importance of the matter brought home to them.

COLOURLESS LABEL VARNISH.

The following note on a colourless varnish for labels, has been sent to the Imperial Commissioner of Agriculture by Mr. R. Radclyffe Hall, B.A., Assistant Professor of Chemistry at Barbados:—

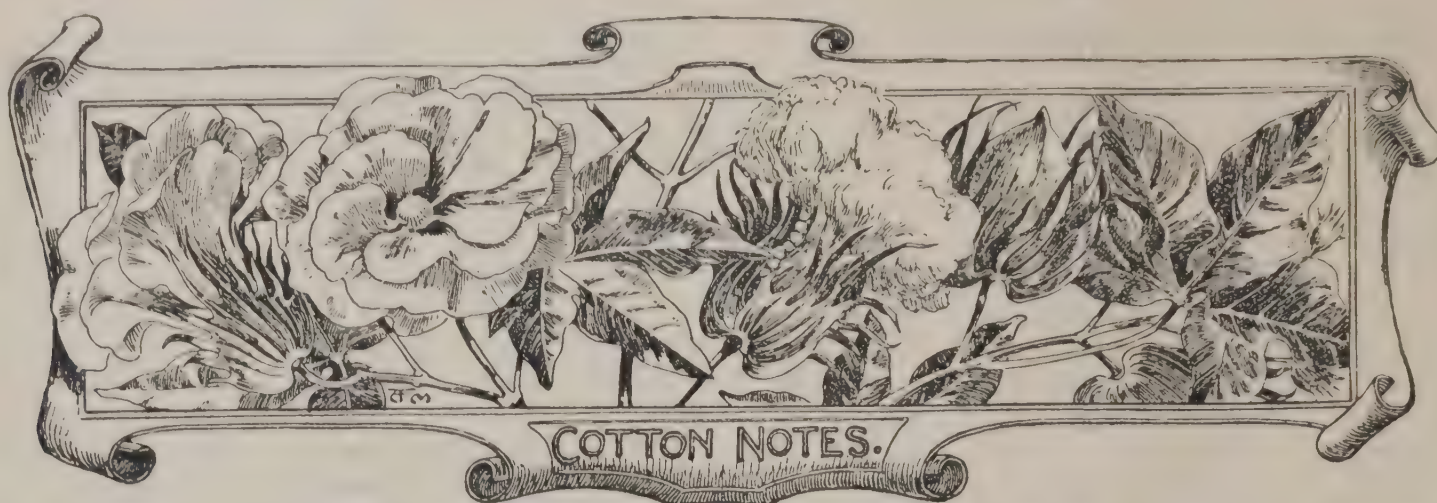
I have the honour to inform you, in continuation of my letter published in the *Agricultural News* (Vol. IV, p. 382), that I have been trying the varnish therein referred to, as a label varnish.

If the paper label is brushed over with a thin coating of gum or 'size' and allowed to dry, a coat of this 'gum' varnish will not sink in and affect the paper, but will quickly dry hard and bright, and afford good protection to the label without affecting its clearness. I have tried it on a book label, and find I can handle the label and get it wet without affecting the varnish.

The following is the recipe of the gum referred to by Mr. Hall:—

Gum mastic, 2 parts by weight,
Gum sandarach, 3 parts by weight,
Gum elemi, 1 part by weight,
Camphor, 1 part by weight,

dissolved in about 20 parts of strong alcohol. The alcohol should be 90 per cent. strength or over. The resins or gums are shaken up in the alcohol until dissolved, which takes place quickly, and the solution is allowed to settle for a day before decanting. It evaporates very rapidly, and must, therefore, be kept tightly corked.



MANURES FOR COTTON.

An interesting experiment in the use of cotton seed (cake) meal, and crushed cotton seed as manure for cotton, is given in Bulletin No. 70, of the Georgia Experiment Station.

In this experiment, one series of plots was treated with a fertilizer in which the nitrates were supplied in the cotton seed (cake) meal, while in the other series, the nitrates were supplied in the crushed cotton seed. In other respects, the fertilizers were alike, except that a slight difference was made in the potash and phosphate to 'balance' the manures with regard to these substances.

The make up of these fertilizers may be seen from the accompanying table, which gives the estimated cost as well:—

	No. 1.	No. 2.
Cotton seed (cake) meal ...	409 lb.	— lb.
Crushed cotton seed ...	—	177
Acid phosphate	351	355
Muriate of potash ...	22	25
Value (per acre) ...	\$6.91	\$5.77

In addition to these, each plot received as a starter, nitrate of soda at the time of planting, at the rate of 22 lb. per acre.

In the total yield of six plots ($\frac{1}{2}$ acre), No. 2. gave 2 lb. of seed-cotton more than No. 1 on an equal area.

The following conclusions are quoted from this bulletin:—

(1) That it is not expedient to use crushed cotton seed directly as a fertilizer for a cotton crop, unless the distance necessary to haul the seed and meal in effecting a sale and purchase, or an exchange, is too great to justify the substitution of cotton seed (cake) meal.

(2) That for fertilizing a crop of cotton, 177 lb. of cotton seed (cake) meal is the effective equivalent of 409 lb. of cotton seed to be properly 'balanced' and applied directly to the soil; or 865 lb. of cotton seed (cake) meal is the fertilizing equivalent of 2,000 lb. of crushed cotton seed.

COTTON IN BRITISH CENTRAL AFRICA.

The first report on the cotton-growing industry in British Central Africa, by Mr. Samuel Simpson, Cotton Expert, has been issued by the British Cotton-growing Association. It deals with the growth of the industry during the past three years, during which time the exports had increased from £3 to £6,941.

Labour is both plentiful and willing, but not very efficient. Native cultivation is rather crude and primitive, but there is a ready market for seed-cotton, and the natives ought to produce considerable quantities of cotton for sale.

Transport charges are heavy, but the railway now in process of construction will, in a few years, materially improve the transport facilities.

The kinds of cotton to grow are discussed, but, so far, it does not appear that any one variety is suited to the different localities, nor that any variety has been definitely chosen as the best for any given section. Several, however, are recommended for trial.

Appendix A of the report deals with the matter of seed selection, and outlines a scheme similar to the one now in operation in the West Indies (see *West Indian Bulletin*, Vol. IV, p. 208). Appendix B deals with the insect pests of cotton, the principal of which are the boll worm (*Heliothis armiger*), the cotton stainer (*Dysdercus* sp.), and the green fly (Aphididae). In addition to these, there are the leaf-miners, stem borer, leaf-eating caterpillars, and locusts.

From this report it would seem that the cotton industry is likely to succeed in British Central Africa, although at present, it is in an experimental condition.

COTTON IN ST. KITT'S.

In a letter to the Imperial Commissioner of Agriculture, the Agricultural Superintendent at St. Kitt's reports that account sales have been received for 4 bales of cotton which sold for 17*d.*, the highest price yet received for St. Kitt's cotton.

This cotton was grown at La Guerite estate from St. Vincent seed, and the yield is better than that of last year, when the American River's seed was planted. This good price is likely to result in an extension of the cotton industry next season.

The yield in St. Kitt's is better this year than last, and this, together with the present high prices, will be likely to create a demand for specially selected and disinfected St. Vincent seed.

SEA ISLAND COTTON MARKET.

The Sea Island Cotton Report of Messrs. Henry W. Frost & Co., of Charleston, South Carolina, dated February 24, 1906, contains the following:—

Islands.—Were in active demand both for the crop lots as well as for the odd bags, taking all of the offerings on the market, and leaving now a very limited quantity of unsold cotton, the crop being nearly all disposed of.

The report dated March 3, 1906, reads as follows:—

Islands.—The sales which were largely made in conjunction with those of last week, but were not included in the official report, have nearly exhausted the stock, and there remains, to be disposed of, a very limited quantity of the crop.

THE GRADING OF SEED-COTTON.

West Indian Sea Island cotton has acquired a reputation for quality that creates a demand for it when other long-staple cottons find a dull or indifferent market. The quality on which this reputation is based can be maintained only by careful attention to cultural methods. These should be supplemented by the most careful grading of the seed-cotton, and nothing but the very best should be allowed to leave the estate as first grade cotton. Second and third grade cotton will be worth no more when mixed with the better grades, while the first grade cotton will fetch only the price of the inferior grades, if mixed with them.

Toward the end of the picking season, much of the lint produced is extremely weak. As it is impossible to separate the weak from the strong fibres, it will be best to keep this late-picked cotton separate from that produced earlier in the season, which has a much smaller proportion of weak fibres, and would, therefore, be a much stronger cotton. This, late-picked cotton together with any pickings that have been noticed as especially weak during the earlier part of the season, should make the second grade.

Stained cotton, and that which has never properly opened and comes in from the field matted about the seed, would go to make a third grade.

It is very important that seed-cotton bought from small growers should be placed in different classes, according to the length of staple. It is a comparatively easy matter to determine the length of the fibres; other qualities usually vary with the length, the longest fibres being usually the finest and silkiest.

Any particular bale, in which the cotton is not uniform in length, is considerably reduced in value. All purchases of the same length should be put together, unless they differ considerably in other respects and each bag should be marked to show its grade.

The machinery in a spinning factory is adjusted to spin cotton of a certain length, and all fibres shorter than that for which the machines are adjusted go into waste, while the longer ones are likely to be broken. This causes a loss in two ways: the amount of waste is greatly increased, and the broken fibres produce very much weakened threads.

A careful scheme of grading, based on lines similar to those indicated above, should be of great value in establishing the cotton industry in the West Indies.

ANTHRACNOSE OF COTTON.

This disease, which is caused by a fungus (*Colletotrichum gossypii*), is one of the few fungoid diseases of cotton that occur in the West Indies. It causes damage when it attacks the cotyledons of the young plants, or the bolls of cotton. At times, the disease has been known in the cotton districts of the United States to cause a loss of 10 to 15 per cent. of the total crop; but, up to the present, it has not done any great damage in these islands. For the purpose of keeping this disease in check, all planters of cotton are recommended carefully to disinfect their cotton seed before planting, so as to prevent the germination of any spores which remain attached to the seed itself. If this be carefully attended to, no disease of cotyledons in seedling plants should occur. Ratooning of cotton should be entirely abandoned, as the practice of ratooning tends to the development and spread of plant diseases.

With the view of obtaining information respecting any experiments that had been performed by the United States Department of Agriculture, dealing with the treatment of

anthracnose of cotton, the Imperial Commissioner of Agriculture has been in communication with Mr. B. F. Galloway, Chief of the Bureau of Plant Industry. The following extract is taken from a letter from Mr. Galloway and contains valuable information:—

‘This disease has been the subject of some minor experiments by this Department, but, so far as I know, no serious attempts to control it by the use of fungicides have ever been undertaken. At the present time, no combative measures are generally practised in this country. The disease is rather common, but is not generally sufficiently injurious to make it profitable to go to much expense in the way of treatment.

The recommendations that we make to our planters are:—

(1) To avoid seed from infested fields; as we find that, like other anthracnoses, the fungus penetrates the seed and is carried in it.

(2) To plant such varieties as local experience has shown to be least affected by anthracnose.

(3) To give the plants more space, so as to admit light and air, and to use fertilizers containing more potash and phosphorous than nitrogen, in order to produce a hardier and less succulent growth.’

The first two recommendations and the first part of the third are applicable to the West Indies. They should be carefully attended to so as to prevent the disease from becoming at all serious in the islands. Experiments with the use of artificial manures, and their relation to this disease might be conducted next planting season in order to obtain exact information on this point; for, up to the present, the relation between artificial manures and disease has not been fully worked out in the West Indian Islands.

Articles on the disinfection of cotton seed for the purpose of killing any adherent spores have repeatedly appeared in the *Agricultural News* (Vol. III, pp. 117 and 149; and Vol. IV, p. 101), and further reference will be made to it in the future, when the experiments of the Imperial Department of Agriculture, dealing with this subject, will have been completed.

THE WORLD'S RUBBER SUPPLY.

In its issue of January last, the *Journal of the Society of Arts* contains the following information on the principal sources of rubber supply:—

At present, largely owing to the and encouragement given by the Government and the Botanical Departments at Kew and Ceylon, and the easily available land in the Malay Peninsula and other colonies, the British rubber-planting industry leads the world. But elsewhere the industry has grown, and is growing apace, notably in Mexico. The Hindalgo Plantation and Commercial Company, owning among others the famous La Zacualpa plantation, is believed to have on that one estate something like 2,500,000 trees, and the Mexican Mutual Planters Company owns large plantations of *Castilloa elastica*. In Liberia, there are vast forests largely filled with rubber trees which are being exploited by British capitalists; and some efforts are being made to increase the forest growth by planting in the West Indian Islands, where climate and soil are very suitable. Java is expected to export very large quantities of rubber in the course of the next few years, and steps are being taken to promote the growth of the rubber tree in the Philippines. Altogether, it would seem that while the demand for rubber is steadily and even rapidly increasing, the sources of supply are being extended in at least an equal degree.

EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming, should be addressed to the Commissioner, Imperial Department of Agriculture, Barbados.

All applications for copies of the 'Agricultural News' should be addressed to the Agents, and not to the Department.

Local Agents: Messrs. Bowen & Sons, Bridgetown, Barbados. *London Agents:* Messrs. Dulau & Co., 37, Soho Square, W., and The West India Committee, 15, Seething Lane, E.C. A complete list of Agents will be found on page 3 of the cover.

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Agricultural News

VOL. V. SATURDAY, MARCH 31, 1906. No. 103.

NOTES AND COMMENTS.

Contents of Present Issue.

The editorial in this issue deals with the selection of cotton seed for planting purposes with the view of improving the quantity and quality of the lint.

A note appears on p. 99 comparing seedling canes with Bourbon and with mixed varieties, and showing the average superiority of the seedlings for the past five years.

The cotton notes on pp. 102-3 give some interesting facts with regard to cotton, including a brief article on anthracnose, and a note on the relative values of cotton seed meal and crushed cotton seed as a manure for cotton.

The information with regard to grading seed-cotton on p. 103 should be read carefully by all cotton growers, and by all purchasers of seed-cotton from small growers.

The insect notes on p. 106 include an account of two cotton pests from Egypt, and a description of an insect that has recently appeared as a household pest in Barbados, and is known to occur in other West Indian Islands.

On p. 107 will be found an interesting review of the agricultural industries at St. Kitt's dealing with the present condition of sugar and cotton in that island.

An interesting review of the reports of the Superintendent of Agriculture in Fiji appears on p. 110, and on the same page information is given as to the rearing of geese, which should be of interest to the readers of the *Agricultural News*.

On p. 111 an account is given of a recent meeting of the St. Vincent Agricultural Society, when the Imperial Commissioner of Agriculture reviewed the condition of the Agricultural Industries of that island and spoke of the needs and prospects for the future.

Dominica Rubber.

The following is extracted from the report of Messrs. Hecht, Levis & Kahn, rubber brokers, London, on two samples of Castilloa rubber from Dominica, forwarded to them by the Imperial Commissioner of Agriculture:—

'It would appear that sample "A" is described as a useful rubber and well cured, and is valued at about 5s. 7d. to 5s. 9d. per lb. Sample "B" is also classed as good, but is described as imperfectly cured, and worth 2d. per lb. less than sample "A."'

The Imperial Commissioner regards the report on the samples of Castilloa rubber as especially favourable, and in view of the equally satisfactory reports received on previous occasions, there can be no doubt that rubber of the highest quality can be produced in Dominica.

Tropical Fruits in England.

A recent number of the *Port-of-Spain Gazette* mentions some of the tropical fruits that have grown in favour in the English market during the past few years.

Most of these are known to residents in the West Indies as, for instance, the avocado pear, the granadillo, the custard apple, guavas, grape fruit, mandarin oranges, and the mango.

One, which is rare and probably not well known, is *Monstera deliciosa*. Mention was made of this fruit in the *Agricultural News* (Vol. IV, p. 359), where it is stated that this plant is a native of Mexico, and belongs to the Natural Order *Aroideae*, to which belong also the tanniers.

The succulent fruits are edible, and have a delicate flavour somewhat resembling that of the pine-apple.

Fruiting plants of *Monstera deliciosa* may be seen at many of the Botanic Gardens in the West Indies.

The Improvement of Cotton.

The production of fine cotton in the West Indies is an industry that bids fair to be permanent so long, at least, as the sugar industry is in its present critical condition. West Indian Sea Island cotton has met with an extremely favourable reception in the English market, and has made a place for itself, fetching top prices. This place can be maintained only by the utmost vigilance on the part of the producers. They must use the best seed, give the best of attention to the growing crop, and must exert the best of judgment in grading the product. Much has appeared in the *Agricultural News* on this subject, which should aid the growers in attending to the details of cotton culture in such a way as to enable them to maintain the present excellence of the West Indian product.

A.B.C. of Cotton Planting.

An application has been received from the Government of the French Colonies for permission to translate and publish 'A.B.C. of Cotton Planting,' the text-book of the Imperial Department of Agriculture. It may be mentioned that a new and enlarged edition of this useful pamphlet is in course of preparation, and the Imperial Commissioner of Agriculture would be glad of any hints and suggestions likely to render the work still more useful to cotton growers in these islands.

The Canadian Preference.

Writing on the subject of the preferential tariff between Canada and the West Indies, the *International Sugar Journal*, for March 1906, says: 'We are glad to know that, for the present at any rate, the Canadian refiners have agreed to renew the arrangements under which the West Indian sugar producers will once more come in for a share of the 33½ per cent. preference. The refiners have consented to purchase West Indian sugars on their arrival, at rates equivalent to those ruling in New York, plus 10c. per 100 lb. for muscovado, and 12c. per 100 lb. for crystals. This new agreement shall not last longer than July 1, next, unless renewed, but it is hoped that it will be continued by fresh negotiation. It is only fair that the West Indian producers should benefit from the reduction in tariff accorded by the Canadian Government; but if the refiners are allowed to have the whip-hand, they will naturally do their best to pocket as much of this rebate as they can.'

Barbados Fish-curing Factory.

The Fish-curing Factory started at Barbados in 1903 by the Imperial Department of Agriculture, is still carrying on operations, but on a smaller scale than was anticipated owing (according to Mr. Hunte) 'to the catch during the last two years being only sufficient to supply fresh fish to the local market.' This comparative scarcity of flying-fish is confirmed from other sources. Fish curing will pay only when the original cost delivered at the factory ranges at about 16 cents. per 100.

During the season from May 1903 to July 1904, 152 barrels of flying-fish, and 1,270 lb of albacore, dolphin, bill fish, and red snapper were cured. Of these, 118 barrels of flying-fish and the whole of the other fish were disposed of at fairly good prices, leaving 34 barrels on hand.

During the season from May 1904 to July 1905, 34½ barrels and 4 kegs of flying-fish, and ½ barrel of bill fish were cured and disposed of, in addition to what was carried over from the previous year. In both years, a small profit was earned on the working of the factory.

It is proposed to continue operations in the hope that the supply of fish may increase during the coming season. The experience gained has been of a useful character, and, if a sufficient quantity of fish could be obtained, the industry would be successful.

Agricultural Education.

The following is taken from *Britannia* of February 1906, pp. 67-8:—

'The West Indies were intended by nature to be the fruit garden of America and Europe, and the Imperial Department of Agriculture for the West Indies, since its institution in 1898, has been furthering this intention, by training the young mind in agricultural science in addition to the ordinary school course. It is eminently desirable that, with the natural advantages of soil and climate, the children, especially the boys, should be trained in practical agriculture, along with a solid grounding in the three R's, as it is on agriculture that the future prosperity of the colonies depends. In Barbados, in Trinidad, in Grenada, in St. Vincent, in Dominica, and in the Leeward Islands generally, agriculture is taught scientifically and practically in the agricultural schools, and many of the primary schools have plots devoted to practical and experimental work. Substantial progress has been made, and made, too, on the right lines, for it is inevitable that this early training will soon overcome the innate aversion to manual labour common to the West Indies, and help in the making of men who will be worthy of their place within the Commonwealth.'

West Indian Produce Association.

The *West India Committee Circular* for March 2, 1906, contains an editorial on the formation of an association for the purpose of developing the demand for all kinds of West Indian produce in England. The following is quoted:—

'The newly-fledged West Indian Produce Association has taken over, as going concerns, the old-established businesses of James Philip & Co. and the Pure Cane Sugar Company, which for nearly a quarter of a century have been dealing successfully in all kinds of West Indian commodities, and the more recently formed Monocane Sugar Company, which for two years past has mainly devoted itself to advertising the pure cane sugars of the West Indies, which used to be so popular in our childhood's days. It will thus be seen that the organizers of this new movement have adopted the policy of developing and extending existing businesses, and we believe that they have been wise in doing so. The success which attended the efforts made during last summer at the Colonial Exhibition to popularize West Indian produce, made it appear that the moment was opportune for developing the latent demand for it, the existence of which has for a considerable time past been recognized. The West Indian Produce Association is to be conducted on a business footing, and no attempt will be made to go behind existing organizations dealing with West Indian produce, but rather to help them, the Directors believing that the possibilities of this movement are so great that by advertising West Indian produce and making it better known in this country generally, they will not only be helping the West Indian Colonies, but will also be acting in the interest of existing firms who handle it, and who should, therefore, also reap the benefit.'



INSECT NOTES.

Cotton Insects from Egypt.

A correspondent in Egypt has recently forwarded to the Imperial Department of Agriculture specimens of two insects which occur on cotton in Egypt.

One of these is the larva of a small moth, which bores into the cotton bolls and eats the inside of the seed, leaving only the empty seed-coat. This is probably the Egyptian cotton boll worm (*Earias insulana*), one of the most serious pests of cotton in Egypt.

The other insect belongs to the Hemiptera or true bugs. They are small black insects with whitish wings. The young have reddish bodies, and when crushed on the cotton fibre produce a stain similar to that of the cotton stainers. They infest bolls that have been attacked by the boll worm, and those that have opened in ripening, sucking the juice from the pod, seeds and fibre.

Both these insects have been dealt with in a small book entitled *Notes on Some Egyptian Insect Pests*, by F. Fletcher, B.A., B.Sc., etc., which was mentioned in the *Agricultural News* (Vol. IV, p. 314) as likely to be of value to planters of cotton and other crops in Egypt.

Insecticides for 1906.

Owing to remarkable advances in the price of arsenic, all arsenical insecticides are now commanding higher prices than last year, and these seem likely to prevail for some time. This would affect Paris green, London purple, and arsenate of lead, all of which have been discussed in previous issues of the *Agricultural News*.

Information has recently been obtained in regard to green arsenoid, and at least one dealer in Barbados has a stock of this insecticide on hand, in preparation for the coming cotton season.

Green arsenoid is a calcium arsenite, and has in the past been considerably cheaper than Paris green, and it has been found in trials in the United States to be as effective an insecticide as Paris green.

Experimental trials of green arsenoid will be made during the coming season.

A report on arsenical insecticides has been prepared by the Island Professor of Chemistry at Barbados, which will be dealt with in a future issue, as will also the results of trials of green arsenoid when these are available.

The Blood-Sucking Cone-Nose.

Within the past year several specimens of a large hemipterous insect have been caught in houses in Barbados and sent to the Imperial Department of Agriculture for identification. In some cases the question has been asked whether it bites, for it has been stated that some member of the family has suffered a severe bite or sting, and the insect forwarded has been suspected as the cause.

The insect, or bug, for it is one of the true bugs, has been identified as the blood-sucking cone-nose (*Conorhinus sanguisugus*). It is found in the Southern States and throughout the tropics. The younger stages of development live on

trees or plants, and feed upon other insects. The adult gets into houses and frequently 'bites' human beings. The bite, however, is like that of the mosquito, merely a puncture for the purpose of sucking the blood of the victim.

The bite of this insect is sometimes very severe, accompanied by intense irritation and swelling, and occasionally results in fever sufficient to make it necessary to call a physician. None of the more severe cases have, however, come under notice in connexion with the specimens submitted to the Imperial Department of Agriculture.

The insect is nearly an inch in length, black in colour, with a series of reddish spots along the sides of the dorsal surface of the body. The proboscis is short and stout and is turned under the body, and the antennae, which are composed of four segments, are stout at the base, while the apical segment is filiform. It may be distinguished from closely related insects by the red spots and the thread-like apical segment of the antennae.

EDUCATIONAL.

School Gardens in the Leeward Islands.

The following are extracts from the report by the Inspector of Schools on the Educational Department in the Leeward Islands published in the *Official Gazette* for February 15, 1906:—

There are, at present, twenty-five school gardens in actual operation which are distributed as follows: Dominica, five; Montserrat, six; Antigua, seven; Nevis, three; St. Kitt's, four. Five other gardens have begun work, but are not yet fully established. Many schools, however, not authorized to earn grants for a garden, do something towards beautifying the school premises by planting a few flowering plants. Most of the school gardens have received a set of tools costing £5, while necessary expenditure on the rough preparation of the soil, and on fencing, has been met. It is difficult, and in some cases impossible, to obtain land conveniently near to the school on which a garden may be made. The water supply is frequently precarious or non-existent, and, in many localities on the windward sides of the islands, wind-breaks must be planted before a garden can be established.

In Dominica, where a garden should be attached to each school, there has been difficulty in acquiring suitable plots of land. As regards the schools on the leeward coast, land is absolutely unobtainable, and the establishment of four of the gardens on the windward side has only been possible through the kindness of local proprietors, who have given plots for the use of the schools. In all the gardens the work has been neat and progressive, and some of the schools have received the Diploma of Merit of the Imperial Department of Agriculture for exhibits at the local shows.

The products of the gardens are the property of the boys and girls who work in them. A record is kept of each day's instruction, and, in schools where the vegetables are sold, a cash book shows the expenditure incurred as well as the receipts. It is evident that the work in the gardens is found interesting, and it appeals to children who show little aptitude for the ordinary subjects of instruction. One instance may be quoted as showing the keenness displayed. Olveston school (Montserrat) to which a garden was attached, was closed in September, 1904, but the garden class continued to work on its own initiative, with assistance from the Agricultural Instructor, until February, 1905, when several of the boys took prizes at the local show.

AGRICULTURAL INDUSTRIES AT ST. KITT'S.

The Imperial Commissioner of Agriculture for the West Indies addressed the members of the St. Kitt's Agricultural Society at Basseterre on February 26 last. His Excellency the Acting-Governor (Sir Robert Bromley, Bart.) occupied the chair.

The Imperial Commissioner congratulated Sir Robert Bromley and the members of the planting community at St. Kitt's, on the formation of a representative Agricultural Society, and expressed the hope that it would exercise a beneficial influence on the agricultural industries of the island.

SUGAR.

The welfare of St. Kitt's, as that of Barbados, he stated, depended on the muscovado sugar industry. The class of sugar produced was getting into less and less demand, especially in the markets of the United States and Canada. The future, therefore, of communities entirely dependent on muscovado sugar was becoming a precarious one, and the more so at the low prices now ruling. As recently pointed out by Dr. Watts (*West Indian Bulletin*, Vol. VI, pp. 373-86), the average production of sugar in St. Kitt's from 1881 to 1894 was 16,078 tons, of the gross annual value of £194,442, or at the rate of £12 6s. 2d. per ton. On the other hand, during the period 1895 to 1904, the annual production was 12,884 tons, having an annual value of £104,297, or at the rate of £8 1s. 10d. per ton. While the average amount of sugar produced during the latter period was fully 80 per cent. of that of the earlier period, the actual value was only 52.5 per cent.; hence the planters in St. Kitt's-Nevis had been compelled, during the last ten years, to carry on their sugar industry on about one-half the monetary income to which they had been accustomed during the previous ten years.

The Imperial Commissioner pointed out that the only sound remedies available were: The improved, and, at the same time, economical cultivation of the best canes suited to the several districts of the island, and the establishment of central factories.

The sugar industry at St. Kitt's-Nevis passed through a very critical stage in its history a few years ago when the old canes, hitherto under cultivation, were severely attacked by disease. Fortunately, owing to the advice and assistance offered by the Imperial Department of Agriculture, new seedling canes, to replace the old varieties, were largely introduced and established, with the result that, in some instances, individual estates that had previously been threatened with ruin, have since completely recovered. The principal seedlings that have assisted in this direction were B. 147 and B. 208.

In recommending the erection of central factories, the Imperial Commissioner quoted figures showing the successful working of the central factory at Antigua during the year 1905, and offered suggestions, in detail, as to the best means of securing co-operative action in starting a pioneer factory at St. Kitt's. Taking into account the favourable conditions obtaining at St. Kitt's, as regards its fertile and easily-worked soil, and the fairly uniform rainfall, a scheme of central factories would be likely to place the sugar industry at St. Kitt's on as sound a basis as any in the West Indies.

COTTON.

The Imperial Commissioner then briefly reviewed the progress made in growing cotton as a catch crop with sugar-canes. This island was one of the earliest to take up the cotton industry. The area planted at St. Kitt's in 1904-5 was

987 acres. The amount of lint exported was 87,080 lb., of the estimated value of £4,354. The total value of the lint and seed produced in the Presidency (i.e., in the islands of St. Kitt's, Nevis and Anguilla) in 1904-5 was about £14,000. If it were possible to continue the system of growing cotton as a catch crop with canes, the prospects at St. Kitt's would be distinctly promising. According to a statement furnished by Mr. Arthur M. Lee (*Agricultural News*, Vol. IV, p. 102), the estimated clearance, under favourable conditions, on cotton grown as a catch crop, would probably be about £5 per acre. The essential points requiring attention were: (1) Careful selection of seed; (2) good cultivation; (3) constant attention, in order to keep in check attacks of the cotton worm; and (4) the careful picking of the cotton, and carefully grading the lint into two or more qualities.

MISCELLANEOUS.

Amongst other subjects discussed, were the awards of the Gold and Silver Medals offered for competition by Sir Alfred Jones; the necessity for fumigating all seeds and plants imported into the Presidency; and the appointment of Permanent Exhibition Committees.

In the discussion, in which Sir Robert Bromley, Mr. Arthur M. Lee, the Hon. Dr. Watts, the Hon. J. T. Manchester, the Hon. S. L. Horsford and others took part, interesting information was communicated with regard to the successful cultivation of seedling canes, the desirability of establishing central factories, and the favourable prospects existing in the island for extending the cotton industry.

COCO DE MER.

In the *Indian Planting and Gardening* for January last, there is an interesting account of the double or sea cocoa-nut (*Lodoicea sechellarum*). This palm is of more than ordinary interest, and never fails to attract attention.

From the descriptions given by travellers, the sea cocoa-nut is said to be gigantic in its growth, rising from 50 to 60 feet, and sometimes even to 80 feet, with a straight stem 1 foot in diameter. Like the cocoa-nut, the stem is crowned with a tuft of from twenty to thirty leaves, which are very large, some measuring 20 feet in length and 12 feet in breadth. In form, they somewhat resemble the leaf of *Pritchardia pacifica*, but are much larger. The male and female flowers are borne on separate trees.

Previous to the discovery of the Seychelles Islands in 1743, which are the only known islands where this palm is indigenous, all sorts of wild and romantic stories were told of it, and the nuts, which were often picked up on the West Coast of India, on the Maldives, and Sumatra, were highly prized, and commanded fabulous prices.

Since the discovery of the country of their origin, they have been, naturally, less valued as curiosities. At the present day, however, they are still prized by the natives of India, who use them for a number of purposes.

In the Cannanore jail, these nuts are beautifully carved by the prisoners, and are converted into cigar boxes, toilet cases, and all sorts of useful and ornamental articles.

This interesting plant has been mentioned in previous issues of the *Agricultural News* (Vol. II, p. 108, Vol. III, pp. 156 and 429, and Vol. IV, p. 380), from which it will be seen that specimens are growing at the Botanic Station, Dominica, and at the Royal Botanic Gardens, Trinidad.

The article on p. 429 of Vol. III, contains information as to the export of the nuts from the Seychelles, and the use, in Mauritius, of bowls made from the shells of these nuts for removing sugar from the centrifugals. The use of the kernel for vegetable ivory is also referred to.



GLEANINGS.

The *India Rubber World* for March 1, 1906, states: 'Mozambique of late has been showing a considerable increase in the export of crude rubber, which is of good quality.'

The plague of the cacao planter in Samoa is rats. Their agility in running up the trees, and their appetite for ripe pods, are something wonderful. Tin placed round the tree stems is found to be most effective, the rats not being able to climb over the smooth surface of the metal. (*Tropical Life*, February 1906.)

The *Jamaica Daily Telegraph* for February 22 last, says: 'The Agricultural Society holds that the 2s. peripatetic licensed produce buyer is responsible for the poor coffee which is now being exported from this island, and will urge the Government to take steps to stop the evil which is fast threatening to wipe out the industry altogether.'

At a meeting of the Board of Management of the Jamaica Agricultural Society held on February 21 last, the *Daily Telegraph* reports that it was agreed, in accordance with the suggestion of the Imperial Commissioner of Agriculture for the West Indies, to arrange for the representation of Jamaica at the Canadian exhibitions to be held at Toronto and Halifax in the autumn of this year.

With copra, according to Messrs. Corrie, McColl & Co., the market generally for usual qualities is easy, and the tendency is lower; but Ceylon copra is very firmly held, owing to the good local demand. Shipping houses ask about £19 15s., c.i.f., d.w., but there are second-hand sellers at £19 10s., and we quote buyers at about £19 5s. (*Tropical Life*, February 1906.)

The manufacture of molasses into aguardiente in Mexico has been the common rule, but, says the *Louisiana Planter* for February 24 last, General Frisbie is experimenting with it in the feeding of cattle. This, it is thought, may work something of an ethical revolution in Mexico by creating a better demand for molasses as stock feed, and less demand for it for manufacture into rum or aguardiente.

The following extract from the report of Mr. G. Eustace Burke, Canadian Commercial Agent, was published in the *Jamaica Daily Telegraph* for February 17, 1906: 'It will, I am sure, also interest those occupied with the many uses of rubber, that very serious attention is being paid to its extensive cultivation in the colony. Many acres have already been planted out, and a lively discussion is now in evidence as to the localities and most advisable methods to be pursued in cultivation to obtain the most satisfactory results. The Botanical Department is taking a good deal of thoughtful interest in the subject.'

Says the *Port-of-Spain Gazette* for March 9 last, the S.S. *Magdalena* took away yesterday, for the British West India Fruit Company, 91 boxes of oranges, 204 crates and 854 bunches of bananas, and 6 crates of mixed fruit. There were other shipments from private sources.

On the west coast of Mexico, and especially in the state of Sinaloa, quite a large crop of sugar is reported as now coming off. The sugar factories and the sugar planters generally have trouble in getting enough labour to handle the crops, and are hiring labourers from the adjoining territory of Tepic at higher wages. All this would seem to show that Mexico has labour problems of her own to solve. (*The Louisiana Planter*, February 24, 1906.)

The Fijian correspondent of *Tropical Life* writes in the February issue as follows: 'Most of our bona fide settlers are banana and cocoa-nut men; still cacao is making some headway. Castor oil is also being planted, and large areas of rice have been laid. The colony is to be represented at the New Zealand exhibition, with a view of drawing settlers here. There are improvements in our Land Ordinances, by which the Government is enabled to offer freeholds to such men.'

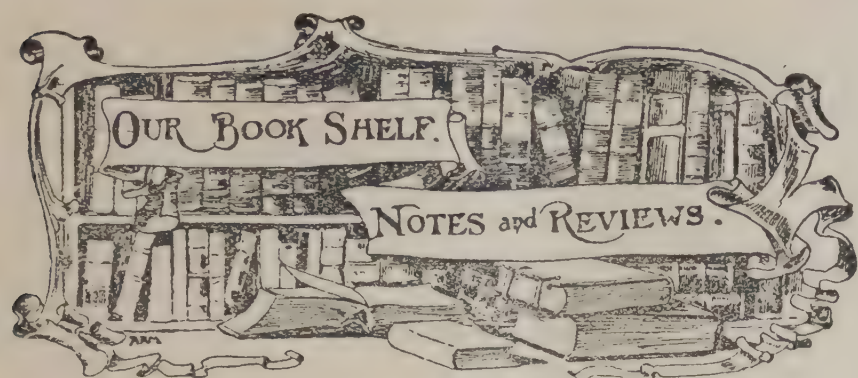
It is stated in the *Jamaica Daily Telegraph* for March 3, that an interesting exhibit of Trinidad products was opened on February 12, at the Montreal Board of Trade.

The exhibit deals entirely with the natural products of the island, and includes sugars in various grades, running from white to dark brown; coffees of two or three different grades; cacao, manjak, refined and crude; petroleum, copra nut, aromatic bitters, and crude asphalt.

The *Home and Colonial Mail*, in speaking of the prospects of rubber, draws attention to the expansion of production going on in all directions, and to the fortunate fact that, although in face of the number of projected rubber cultivation schemes the market might be considerably disturbed, it remains firm. The sources of supply should be equal to the demand, although, at present, there seems no limit to the latter. (*West India Committee Circular*, March 2, 1906.)

Messrs. Wolstenholme & Holland, writing under date of March 1, 1906, state: 'Since our last report, a good business has been done in Sea Island descriptions, and full prices continue to be paid. Barbados cotton realizes from 15d. to 17d.; St. Vincent from 17d. to 20d.; St. Kitt's and Montserrat from 13½d. to 17d.; and Nevis 12d. The St. Vincent cotton sold at 20d. was very excellent quality, and this figure is the highest yet paid for West Indian Sea Island. About 3,000 bales have been sold in Charleston lately at about 14½d. for good crop lots, and the crop lots have now been disposed of.'

Canada's trade with the West Indies is now making very satisfactory progress, the Canadian exports to those colonies consisting of lines either not produced at all by the Mother Country, or not coming into competition with the producing and shipping interest of the United Kingdom, to any appreciable extent. Mr. G. Eustace Burke, Canada's commercial agent in Jamaica, in a report to his Department, just received, referring to the business done by the Canada-Jamaica Direct Steamship Line, says, so successful has been the venture of the company as carriers, in the development of trade exchange between the two countries, that they are about to replace the chartered boats with steamers specially constructed for the trade, the first one to be put on the route this year. (*The Colonizer*, March 1906.)



AN ENUMERATION OF THE VASCULAR PLANTS KNOWN FROM SURINAM, TOGETHER WITH THEIR DISTRIBUTION AND SYNONYMY.
By A. A. Pulle. E. J. BRILL—Leiden. 1906.

This is a comprehensive book supplying a very excellent treatise on the present knowledge of the Surinam flora, as well as giving an interesting account of the history of its investigation.

The author states in the preface that no claims of completeness are made for this work, its objects being to attempt to create an increased interest in this Dutch colony, and to add to our knowledge of the botany of this interesting part of tropical South America.

The portion of the volume that is devoted to the history of the investigations of this flora contains short accounts of the different expeditions and collections that were made in this colony, and shows how many of the older naturalists dispensed with their former occupations to spend their time in making collections, both botanical and zoological, from then little known countries.

The starting point for the enumeration of this flora was a collection made by Professor F. A. F. C. Went of Utrecht, in 1901, and as other expeditions considerably enlarged the material, it became essential to work over as many of the former collections as possible. Considerable help, for the purpose of consulting collections at Kew, Göttingen and Berlin, was rendered by grants of money from the 'Committee for the Scientific Investigation of Surinam' and by the Colonial Minister of the Dutch Government.

The systematic portion of the volume commences with the vascular cryptogams, then treats with the monocotyledons and finally with the dicotyledons. The families and genera very nearly follow the lines of Engler and Prantl in *Die Natürlichen Pflanzenfamilien*, the species being generally enumerated as they occur in *Flora Brasiliensis*. Several new species are described, very good plates being given of some of them.

Towards the end of the volume, plant formations and vegetative zones are recorded, but it is hoped that this is only a beginning, for future work. Many botanists, passing hurriedly through an extended region, have produced numerous so-called formations, which eventually proved to be patches.

Most of the ecological work has, up to the present, been conducted in countries where the floras have been exhaustively investigated; and although the observations made by the author are elementary, they offer considerable possibilities, as ecological observations in a tropical country would be welcomed by all botanists. They must however come from one who knows well the flora he is working with, as the variations of plant combinations are almost infinite, and while it is comparatively easy to describe some of these combinations, it is a task of almost unexampled difficulty to investigate the real relation between them and the physical conditions of the tract under investigation.

MANURIAL EXPERIMENTS WITH SEEDLING AND OTHER CANES IN THE LEEWARD ISLANDS, 1904-5.

This (no. 39) is the latest addition to the pamphlet series of the publications of the Imperial Department of Agriculture. By an oversight, the cover bears the title of 'Manurial' experiments. It should have been 'Experiments with Seedling and other canes in the Leeward Islands in 1904-5.'

The objects of the experiments, conducted on eight estates in the islands of Antigua and St. Kitt's, were for the purpose of finding varieties of sugar-cane likely to increase the output of sugar, and aid the planters in combating the ravages of fungoid diseases and insect pests.

In Antigua, the results of the experiments with plant canes during the season show that seven canes, viz., B. 156, Sealy Seedling, B. 306, B. 208, D. 74, D. 95, and D. 109 stand out as specially worthy of attention.

In St. Kitt's, the best results as plant canes were obtained with Caledonian Queen or White Transparent. The Barbados seedling canes B. 208, and B. 147, were also grown in St. Kitt's with satisfactory results. In addition, the Demerara seedling canes D. 74, and D. 116 are recommended for cautious planting.

The information contained in this pamphlet is well worth diligent perusal, and is evidence of the careful attention and strenuous labour bestowed upon the experiments by Dr. Watts and those associated with him.

ALL ABOUT BANANAS AND PLANTAINS.

Additional Series VI, containing an article reprinted from the *Kew Bulletin* (1894, pp. 229-314) on the 'Species and Principal Varieties of Musa,' has recently been published by His Majesty's Stationery Office, and is on sale by Wyman & Sons, Ltd., Fetter Lane, London, E.C. Price, 1s. 6d.

This reprint contains an exhaustive account of the several species and varieties of bananas and plantains compiled by Sir Daniel Morris, K.C.M.G., when he held the appointment of Assistant Director of the Royal Gardens at Kew. The systematic part is based on the classification adopted by Mr. J. G. Baker, F.R.S., to which is added a description of all the species of Musa known in a wild state. There is also given an enumeration of the cultivated varieties of bananas and plantains existing in India, Ceylon, the Indian Archipelago, Polynesia, Tropical Africa, Mauritius and Madagascar, Venezuela, British Guiana, and the West Indian Islands.

Then follow interesting facts in regard to the cultivation, diseases, and the common uses of bananas and plantains; the utilization of banana fibre; the preparation of banana wine, banana meal, preserved bananas; and the enormous growth of the trade in fresh bananas between Jamaica and the United States, between the Canary Islands and the United Kingdom, and in Fiji, Australia and New Zealand.

Those who desire fuller information with regard to the cultivation of bananas in the West Indies, might profitably consult an article on the 'Banana Industry in Jamaica' by the Hon. W. Fawcett (*West Indian Bulletin*, Vol. III, pp. 153-171), and an article on the 'Fruit Industry of Jamaica' by Mr. W. E. Smith of Trinidad (*West Indian Bulletin*, Vol. V, pp. 53-63). Both articles deserve careful study.



AGRICULTURE IN FIJI.

The following information with regard to agricultural industries in Fiji is extracted from reports by Mr. C. H. Knowles, B.Sc., Agricultural Superintendent, dated February 8 to June 27, 1905.* In the reports, details are given of the methods of cultivation practised on the various estates visited, with recommendations for the treatment of some of the pests met with:—

With reference to sugar-cane, the cultivation generally is very thorough. The continuous 'trench' system, in which the cane plants are placed horizontally and touch each other in the trench, is advocated. It is asserted that this method gives heavier crops than the 'hole' system, and seeing that the trench method has replaced the 'hole' system, which was practised at one time, it is evident that the land must be in good condition to withstand the extra strain put upon it.

The canes are generally free from diseases. Some districts, however, suffer from a disease of an obscure nature in which the tops of the canes die. 'Gumming,' which was once prevalent in Queensland, occurs occasionally. Of insect pests, the borer causes very little trouble, but considerable damage has, at times, been done by leaf-hoppers. Professor Koebele, of the Hawaiian Sugar-planters' Association, has lately been on a visit to investigate the leaf-hopper. He seems to think that the common one in Fiji is not the same as that which causes so much destruction in the Hawaiian Islands.

In the Ba districts are experimental plots. There are 35 acres of different varieties of canes grown for trial and for hybridization experiments, and also 35 acres laid out in manurial experiment plots. This is possibly the first time that such experiments have been carried out systematically in Fiji, and good results are looked for.

On Caboni estate, several varieties of cotton are grown. Sea Island cotton plants were fairly healthy, but the method of planting is different from that practised in the West Indies. The plants are grown 6 feet by 4 feet, and remain on the land for three years. Mr. Knowles is trying to discourage this method for, as he rightly points out, 'if the old plants are left standing they are a harbour of refuge for cotton pests and diseases all the year round, while if they are cut back, the plants grow up straggling, and mix with one another in such a way as to make picking and working the cotton plants difficult.' This is also the experience in the West Indies, where ratooning is now abandoned.

The bananas cultivated are the Gros Michel and the Chinese variety. The latter variety, in certain parts of the island, suffers from a disease which finally causes a stoppage of growth in the plant. Experimental shipments of bananas are being made to Canada. The fruit is broken up into hands, and in some cases, into separate fingers, and then placed closely together in the boxes, no packing material being used. Mr. Knowles is of the opinion that this method will not be found suitable for long voyages.

Rice, cocoa-nuts, cacao, Indian corn, fruits, and vegetables are also cultivated in different parts of the colony. The cultivations are generally good, being clean and free from weeds, and the plants healthy. A few pests are recorded,

but only in a few localities were they in considerable numbers, and, in such cases, recommendations were made for their destruction.

Mr. Knowles is to be congratulated on the careful and intelligent manner in which his reports have been prepared, and it is hoped that his efforts to promote the agricultural interests of the Fiji Islands will meet with the success they deserve.

POULTRY NOTES.

The following notes on geese, taken from the *Journal of the Jamaica Agricultural Society* for February last, may be of interest to poultry rearers in the West Indies:—

All people living on places where there is a considerable stretch of common grass could rear a few geese profitably, as these birds need less care and attention than any other kind of poultry. They do not require to be fed to anything like the same extent as fowls or even turkeys, as they are a grazing stock, just like horses and cattle, and feed upon grass, especially upon the more succulent grasses which grow upon the banks of ponds, and in damp places generally. The young ones, however, need to be fed a little in the morning and in the evening, to start them off growing quickly. The parent birds require a mere bite to encourage them to return home at night. Where they have a good run, they can support themselves on the grass with the other odds and ends picked up, such as seeds and insects. Only towards the selling period should the grown ones be fed more freely, and the last two weeks they should be stuffed with fattening food, as much as they will take.

If the goose has laid her sitting, which may be anything from four or five to a dozen eggs, seldom more, she will want to sit. It will be better that she is not allowed to do this, as the goose makes a poor sitter and an indifferent mother. It is better, then, to put the eggs under a hen. They will take five weeks to hatch, so the hens should be well fed and watered while sitting, and should be occasionally dusted with sulphur, or insect powder to keep away lice, or a piece of sulphur should be put in the nest. The goslings are exceedingly hardy, but it is better not to allow them to get into the water at first. This is one of the reasons why it is better for a hen to hatch them out and rear them. The goslings should be well fed, starting twenty-four hours after they are hatched, on hard boiled eggs, crumbled fine with bread crumbs, and on corn-meal pudding, made simply with corn-meal and boiling water and a little chopped meat. This is the best food for them at first. They should be supplied with plenty of drinking water. If there is water near for them to swim in, there is no need to worry if they take to it. In this climate, it is better to wait until they have feathers, nevertheless, let them have their swim. As a rule, however, going with the hen, they will not want to go into the water, unless simply to bathe and drink. Unlike hens and ducks, geese do not arrive at maturity until the third year, but they are long-lived birds, and even reach the age of thirty years. However, it is better to sell all except stock birds, when they are full-grown, that is about a year old; but they will put on weight quickly after that, and if there are not too many in stock, it will be more profitable to keep them longer. The stock-hens can be kept until they are seven or eight years old, but the gander grows so quarrelsome, that four or five years should be his limit. Geese do not need housing at nights when they are well grown, although it is better to do so when they are young to keep them safe from dogs. When they are older, they will beat off any intruder.

* Mr. Knowles was formerly an officer of the Imperial Department of Agricultural at St. Vincent, West Indies, and left that place on October 29, 1904, to take up his duties in Fiji.

AGRICULTURAL PROSPECTS AT ST. VINCENT.

The Imperial Commissioner of Agriculture addressed a special meeting of the members of the Agricultural and Commercial Society and others at the Court House, Kingstown, on Tuesday, March 6. The Administrator (his Honour E. J. Cameron, C.M.G.) presided.

After a few introductory remarks, in which he expressed his general appreciation of the progress of agricultural efforts at St. Vincent during the last few years, Sir Daniel Morris reviewed in detail the present position of the colony, and urged the necessity of steadily increasing its export trade. He pointed out that twenty years ago, the total value of the exports was £152,530, whereas in 1903, it was only £38,174. The total revenue in 1883 was £32,000; in 1903 it was £21,000. The population in the meantime, in spite of many adverse circumstances, had slightly increased, namely, from 41,000 to 45,000. The value of the exports per head of population in 1883 was 75s.; in 1903 it had fallen to 17s. These figures indicated the need for extending organized industries such as sugar, arrowroot, cotton, cacao, fruit, stock-raising, etc., in order to give steady employment to the people, and to place the resources of the colony on a sound and solid foundation. Such industries were regarded as the mainstay of the agricultural situation, and if they were not established, there would always be danger of the general welfare being suddenly and seriously affected by unfavourable circumstances incidental to all agricultural efforts at St. Vincent and elsewhere.

The Imperial Commissioner made an earnest appeal to all classes to co-operate in the direction indicated. Further, he suggested that action might be taken by the arrowroot growers to control their exports and raise the status of the industry so as to obtain better prices. The sugar industry had almost disappeared, but the land for the most part was still there, and with energy and enterprise much might yet be done. Cacao growing was being extended, and the prospects were favourable. The cotton industry had rapidly developed, and if a good supply of labour were available there were possibilities of still greater success during the next and succeeding years. In 1903-4, the value of the exports of cotton seed and lint was £900; in 1905, it had increased to about £6,000. In the present year (1906), it would probably advance to about £8,000 or £10,000. As regards quality, St. Vincent cotton, last year, reached the highest price of any cotton grown in the British Empire. This year, the best St. Vincent cotton had obtained 20d. per lb. It was anticipated that a trade in exporting bananas would be possible, and St. Vincent possessed favourable facilities for raising horses, mules, cattle and all kinds of small stock, provided the occasional appearance of anthrax could be successfully dealt with. The Imperial Commissioner expressed his readiness to co-operate with the Agricultural Society in efforts to get rid of anthrax, and for the improvement of stock, and referred to the proposal approved by the Secretary of State to start a small Stud Farm in connexion with the Agricultural School. The selection of the animals for this farm would be arranged in accordance with the wishes of those concerned.

Other matters discussed were the provision for fumigating all imported seeds and plants, in order to prevent the introduction of diseases likely to injure crops, and the appointment of a Permanent Exhibition Committee so that commercial samples of the products of St. Vincent might,

from time to time, be contributed, with full information in connexion with them, to the Exhibitions proposed to be held in the United Kingdom, and in the Dominion of Canada.

After distributing the Diplomas of Merit, and discussing the character of the exhibits at the Agricultural Show held at St. Vincent on March 7, the Imperial Commissioner congratulated the island on the formation of its Agricultural Society, thus placing it on an equality with other colonies, where such societies exercised a beneficial influence in developing local industries, as well as in enlisting the cordial co-operation of large and small proprietors alike. He recurred to the subject of the falling off of the exports during the last twenty years, and, whilst expressing his deep interest in the success of the peasant holdings which were in course of being established on a considerable scale at St. Vincent, he spoke strongly as to the necessity, also, of re-establishing permanent industries, following the examples of such thriving communities as those at Grenada and elsewhere, in which peasant holdings prospered side by side with large estates, the value of the total exports in some instances reaching over 80s. per head of the population. He added that it would be most unfortunate if St. Vincent lost the present favourable openings for improving its general condition and prospects.

In conclusion, Sir Daniel Morris dwelt on the admirable concourse of circumstances existing at St. Vincent for the development of local industries. The island possessed a magnificent soil, an abundant rainfall, as well as other advantages which were not enjoyed by places that, at present, were producing much better agricultural results.

THE ASYLUM FARM, BARBADOS.

The following is a brief summary of the report for 1905 by the Officer in charge of the Lunatic Asylum, Barbados, on the farm attached to that institution. The report is addressed to the Colonial Secretary, and is published in the *Official Gazette* of March 15, 1906:—

Owing to the excessive drought during 1905, the fodder for the animals was not sufficient, and some £10 worth had to be purchased. The potato crop also suffered. This meant a curtailment in the number of pigs kept, and a consequent shortage in the farm clearance. Dr. Manning writes in the following terms on the inferiority of the island stock:—

'It is indeed a lamentable fact that the farm stock on the island has so deteriorated by in-breeding that it is no longer possible to produce a pig of any quality whatever. A Barbados pig is a miserable animal, with its long bony head, contracted shoulders, and narrow hips. Every year, too, it is more and more difficult to purchase a really first-class milch cow. Our breed of lop-eared goats has dwindled down to half its size. The poultry are under-sized, and scarcely worth their keep. It is a surprising fact, that in a colony like this, which is distinctly dependent on agriculture for its prosperity, neither the Government, nor any enterprising private individual has ever seriously undertaken any scheme having for its object the improvement of our farm stock.'

Dr. Manning has tried to remedy this state of affairs by the importation of good stock. The Berkshire pigs imported in 1903 are thriving, and the Ayrshire cows are a hardy breed, admirably suited to stand the effects of a tropical climate. A pedigree Jersey heifer, from the celebrated breed of the Bishop of Ipswich, was also imported. By means of these additions, it is expected to improve not only the quantity, but also the quality of the milk.

For the year, the amount of farm produce sold was £547 19s. 9d., whilst the expenditure amounted to £394 7s. 4d., leaving a net clearance of £153 12s. 5d.

MARKET REPORTS.

London,—March 2, 1906. Messrs. KEARTON, PIPER & Co.; Messrs. E. A. DE PASS & Co.; 'THE WEST INDIA COMMITTEE CIRCULAR,'; 'THE LIVERPOOL COTTON ASSOCIATION WEEKLY CIRCULAR,' February 23; and 'THE PUBLIC LEDGER,' February 24, 1906.

ALOE—Barbados, 15/- to 60/-; Curaçoa, 17/- to 60/- per cwt.
 ARROWROOT—St. Vincent, 1½d. to 2d. per lb.
 BALATA—Sheet, 1/4 to 1/11; block, 1/4 to 1/4½ per lb.
 BEES'-WAX—£7 10s. to £7 12s. 6d. per cwt.
 CACAO—Trinidad, 52/- to 60/- per cwt.; Grenada, 47/- to 52/- per cwt.
 CARDAMOMS—Mysore, 7½d. to 3/- per lb.
 COFFEE—Jamaica, good ordinary, 38/- to 40/- per cwt.
 COTTON—West Indian, medium fine, 6/30d.; West Indian Sea Island, medium fine, 13d.; fine, 14d.; extra fine, 15½d. per lb.
 FRUIT—
 BANANAS—Jamaica, 4/6 to 7/- per bunch.
 GRAPE FRUIT—8/- to 10/- per box.
 ORANGES—Jamaica, 6/6 to 9/- per box of 176-200.
 FUSTIC—£3 5s. to £4 per ton.
 GINGER—Jamaica, 48/- to 56/- per cwt.
 HONEY—Dark to ordinary, 16/- to 18/-; good bright, 25/- to 25/6 per cwt.
 ISINGLASS—West Indian lump, 2/1 to 2/4; cake, 1/1 to 1/2 per lb.
 KOLA NUTS—4d. to 6d. per lb.
 LIME JUICE—Raw, 10d. to 1/1 per gallon; concentrated, £17 per cask of 108 gallons; hand-pressed, 2/3 to 2/6 per lb. Distilled Oil, 1/5 per lb.
 LOGWOOD—£4 to £4 15s.; roots, £3 10s. to £4 per ton.
 MACE—Good bold pale, 1/5 to 1/11; good red, 1/6 to 1/7; broken, 1/2 per lb.
 NITRATE OF SODA—Agricultural, £11 7s. 6d. per ton.
 NUTMEGS—53's, 1/9; 74's, 1/4; 85's, 1/1; 94's, 9¼d.; 105's, 9d. per lb.
 PIMENTO—Fair, 2½d. per lb.
 RUM—No quotations.
 SUGAR—Yellow crystals, 14/6 to 17/- per cwt.; Muscovado, 15/- to 15/6 per cwt.; Molasses, 11/- to 15/- per cwt.
 SULPHATE OF AMMONIA—£12 7s. 6d. per ton.

Montreal,—January 18, 1906.—Mr. J. RUSSELL MURRAY. (In bond quotations, c. & f.)

COCOA-NUTS—Jamaica, \$27.00 to \$29.00; Trinidad, \$25.00 to \$26.00 per M.
 COFFEE—Jamaica, medium, 10c. to 11c. per lb.
 GINGER—Jamaica, unbleached, 7½c. to 10c. per lb.
 MOLASCUIT—Demerara, \$1.00 per 100 lb.
 MOLASSES—Barbados, 29c. to 30c.; Antigua, 24c. per Imperial gallon.
 NUTMEGS—Grenada, 110's, 18c. per lb.
 ORANGES—No quotations.
 PIMENTO—Jamaica, 5¼c. per lb.
 SUGAR—Grey crystals, 96°, \$2.00 to \$2.15 per 100 lb.
 —Muscovados, 89°, \$1.50 to \$1.65 per 100 lb.
 —Molasses, 89°, \$1.35 to \$1.50 per 100 lb.
 —Barbados, 89°, \$1.45 to \$1.70 per 100 lb.

New York,—March 2, 1906.—Messrs. GILLESPIE BROS. & Co.

CACAO—Caracas, 11½c. to 12c.; Grenada, 10¼c. to 10¾c.; Trinidad, 10¾c. to 11½c.; Jamaica 9c. to 10½c. per lb.
 COCOA-NUTS—Jamaica, \$25.00 to \$27.00; Trinidad, \$24.00 to \$25.00 per M.
 COFFEE—Jamaica ordinary, 8¼c. to 8¾c.; good ordinary, 8¾c. to 9¼c. per lb.
 GINGER—Dark scraggy root, 7¾c. to 8c.; small white to bright bold, 9½c. to 10c. per lb.
 GOAT SKINS—Barbados, Dominica, and Antigua, 59c. to 61c.; Jamaica, 62c.; St. Kitt's, 51c. per lb.
 GRAPE FRUIT—Jamaica, \$6.00 to \$8.00 per barrel; \$3.50 to \$5.00 per box.

MACE—29c. to 34c. per lb.
 NUTMEGS—West Indian, 80's, 24c.; 90's, 20c.; 100's, 18½c.; 110's, 16c. per lb.
 ORANGES—Jamaica, \$4.75 to \$5.25 per barrel; \$2.50 to \$3.00 per box.
 PIMENTO—4¾c. per lb.
 PINE-APPLES—No quotations.
 SUGAR—Centrifugals, 96°, 31¾c. to 31¾c.; Muscovados, 89°, 23½c. to 21½c.; Molasses, 89°, 23½c. to 21½c. per lb.

INTER-COLONIAL MARKETS.

Antigua,—March 14, 1906.—Messrs. GEO. W. BENNETT BRYSON & Co., LTD.

SUGAR—\$1.27½ per 100 lb.

MOLASSES—15c. per gallon.

Barbados,—March 24, 1906.—Messrs. T. S. GARRAWAY & Co., and Messrs. JAMES A. LYNCH & Co., March 19, 1906.

ARROWROOT—St. Vincent, \$3.80 to \$4.25 per 100 lb.

CACAO—\$11.50 to \$11.75 per 100 lb.

COCOA-NUTS—\$10.00 per M. for husked nuts.

COFFEE—\$10.50 to \$11.75 per 100 lb.

HAY—95c. to \$1.00 per 100 lb.

MANURES—Nitrate of soda, \$65.00; Ohlendorff's dissolved guano, \$55.00; Cotton manure, \$48.00; Sulphate of ammonia, \$75.00; Sulphate of potash, \$67.00 per ton.

MOLASSES—14c. to 15c. per gallon.

ONIONS—\$3.50 to \$4.00 per 100 lb.

POTATOS, ENGLISH—Nova Scotia, \$2.40 to \$3.00 per 160 lb.

RICE—Ballam, \$4.40 to \$4.70 per bag (190 lb.); Patna, \$2.96 to \$3.25; Rangoon, \$2.50 to \$2.75 per 100 lb.

SUGAR—Muscovados, 89°, \$1.40; Dark crystals, 96°, \$1.75 to \$1.80 per 100 lb.

British Guiana,—March 14, 1906.—Messrs. WIETING & RICHTER.

ARROWROOT—St. Vincent, \$8.00 per barrel.

BALATA—Venezuela block, 25c.; Demerara sheet, 38c. per lb.

CACAO—Native, 13c. to 14c. per lb.

CASSAVA STARCH—\$4.25 per barrel.

COCOA-NUTS—\$10.00 to \$12.00 per M.

COFFEE—13½c. to 13¾c. per lb.

DHAL—\$5.40 to \$5.50 per bag of 168 lb.

EDDOES—84c. to \$1.20 per barrel.

ONIONS—Lisbon, 4c. per lb. (ex store).

PLANTAINS—12c. to 36c. per bunch.

POTATOS, ENGLISH—\$2.00 to \$2.40 per barrel.

POTATOS, SWEET—Barbados, \$1.08 per bag.

RICE—Ballam, \$4.90 per 177 lb.; Creole, \$4.25 per bag (ex store).

SPLIT PEAS—\$5.60 to \$5.65 per bag (210 lb.).

TANNIAS—\$1.32 to \$1.44 per barrel.

YAMS—White, \$2.00; Buck, \$2.40 per bag.

SUGAR—Dark crystals, \$1.80 to \$1.90; Yellow, \$2.30 to \$2.40; White, \$3.20 to \$3.25; Molasses, \$1.70 to \$1.80 per 100 lb. (retail).

TIMBER—Greenheart, 32c. to 55c. per cubic foot.

WALLABA SHINGLES—\$3.00, \$3.75, and \$5.25 per M.

Trinidad,—March 16, 1906.—Messrs. GORDON, GRANT & Co.; and Messrs. EDGAR TRIPP & Co.

CACAO—Ordinary to good red, \$11.00 to \$11.25; estates, \$11.50 to \$11.75 per fanega (110 lb.); Venezuelan, \$11.75 to \$12.25 per fanega.

COCOA-NUTS—\$20.00 per M., f.o.b.

COCOA-NUT OIL—75c. per Imperial gallon (casks included).

COPRA—\$3.10 to \$3.25 per 100 lb.

DHAL—\$4.50 to \$4.80 per 2-bushel bag.

MOLASSES—16c. per gallon.

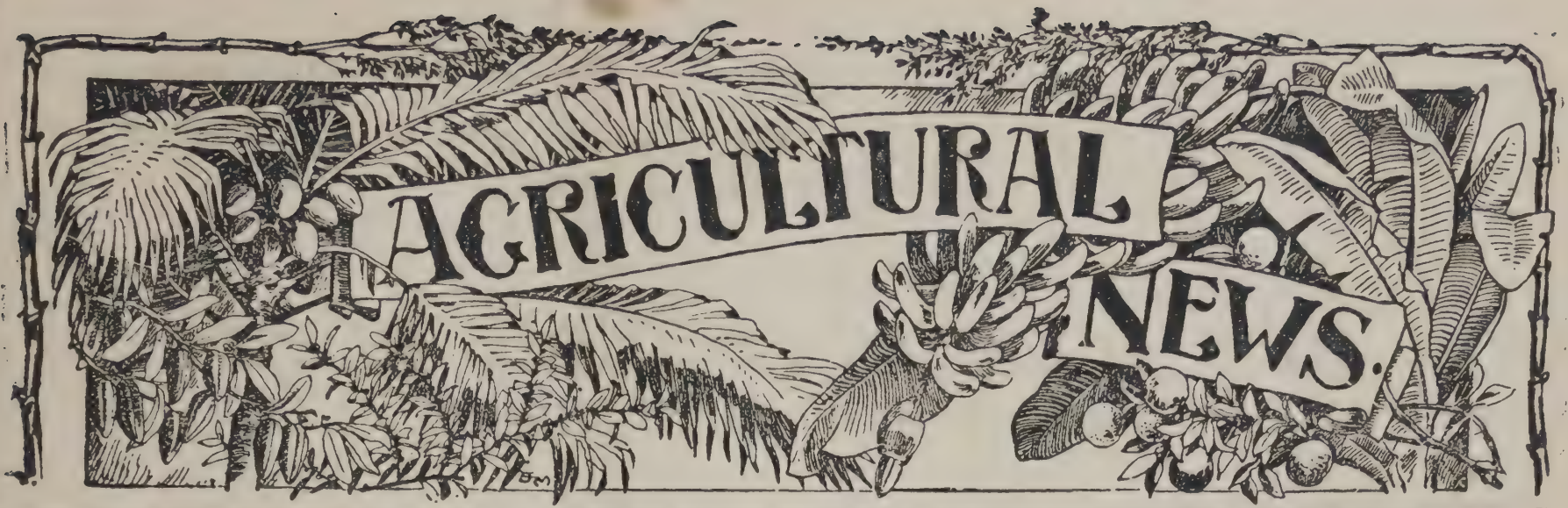
ONIONS—\$2.00 to \$2.50 per 100 lb. (retail).

POTATOS, ENGLISH—\$1.20 to \$1.50 per 100 lb.

RICE—Yellow, \$4.75 to \$5.10; White, \$5.00 to \$5.90 per bag.

SPLIT PEAS—\$4.90 to \$5.00 per bag.

SUGAR—Yellow crystals, \$2.00 to \$2.25; molasses; \$1.75 to \$2.00 per 100 lb.



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planting only the best seed, as a means of maintaining the high standard of quality of the cotton produced in these islands, that it will supply such seed, and deliver it any port, at cost price.

It is hoped by such means to make it tolerably certain that no inferior seed will be planted during the year 1906, and, with that view, the hearty co-operation of all who are interested in the success of the cotton industry is invited, in support of the policy which the Department has consistently advocated since cotton planting has been taken up, in these Colonies, on systematic lines.

Among other matters, it should be borne in mind, that the casual purchase or exchange of cotton seed between individual planters in the several islands, unless such seed is properly disinfected before it is shipped, is likely to lead to the introduction of diseases into localities where they have not hitherto existed. If, for instance, the leaf-blister mite were introduced into Barbados, or the cotton worm into St. Vincent, the favourable conditions now existing in those islands for growing cotton would be seriously affected, especially as a new disease is generally much more destructive than one that has existed in a locality for some time.

Cotton Seed for Planting.

IN the previous number of the *Agricultural News*, it was announced that the Imperial Department of Agriculture was prepared to undertake to supply planters throughout the West Indies with specially selected and disinfected cotton seed for planting during the coming season. The Department is so impressed with the importance of

Planters everywhere would do well this year to plant no seed except such as is supplied through the officers and recognized agents of the Department. They should even discard their own seed, unless the cotton produced from the plants yielding it has obtained prices ranging from 18d. to 20d. per lb., and the vigour and yield of the plants have been correspondingly satisfactory.

The arrangements necessary for the successful distribution of the large quantities of selected and disinfected seed that will be required this year, will impose a considerable addition to the heavy duties already imposed on the officers of the Department, but it is felt that, until the work of selecting and disinfecting cotton seed has become thoroughly familiar to those engaged in the industry, the assistance of the Department is essential, in order to secure collective action in a matter on which, it is no exaggeration to state, the entire success of the industry depends.

In special instances where planters propose to use local seed, and desire to select and disinfect it as required, for planting purposes, they are recommended to consult the agricultural officers within their reach, and obtain full information on the subject. A careful study of the article entitled 'Disinfection of Cotton Seed,' which appears on p. 119 of this issue, will also be useful in this direction.

The conditions under which the Department undertakes to supply cotton seed during the coming season are as follows:—

The Department is prepared to supply the best quality of selected and disinfected cotton seed, to meet the requirements of planters during 1906, at cost price; but it is desirable that it should be distinctly understood that no liability whatever attaches to the Department in regard to any seed that may arrive at its destination in bad order. The Department's responsibility ceases when the seed is placed on board, at the port of shipment.

It is recommended that, for their own protection, the cotton growers should, on the arrival of the seed, immediately turn it out of the bags or barrels in which it is received, and spread it on a dry floor for a day or two, in order to get rid of any excess of moisture which may be contained in it. Also, that a few seeds should be tested for germination by being planted in soil, or placed between folds of damp cloth as described in the *Agricultural News* (Vol. II, p. 153).

If so desired, a sample of the seed may also be forwarded, for testing purposes, to the officer through whom it was ordered; but, in this case, the sample must reach that officer within seven days after the seed has been received by the purchaser, otherwise it cannot be dealt with.

It is recommended that all selected and disinfected seed should be planted within a period of one month after delivery.

SCIENCE NOTES.

At a meeting of the Scientific Committee of the Royal Horticultural Society, held on March 6, mention of which is made in the *Gardeners' Chronicle* of March 17 last, the following interesting points were discussed:—

Mealy Bug on Bananas.—Mr. Saunders reported that the mealy bug on bananas from Jamaica, shown by Mr. Worsley at the last meeting, appeared to belong to the same species as the commonest of the greenhouse mealy bugs (*Dactylopius longispinus*, *D. adonidum*, or *Coccus adonidum*).

Oranges Decaying.—Mr. Chittenden reported that some Navel oranges had been received from the Western Orchards Produce Company, with the request for some information as to the cause of the rot that had set in. He had reported that the oranges are attacked by the fungus *Penicillium*, a frequent cause of loss with oranges. The trouble usually appears after the oranges are packed and on their way to England, and this seems to have been the case with those sent. Navel oranges are very frequently attacked, the open eye of this fruit forming a convenient place for the entry of the minute fungus spores; sometimes, indeed, they are infected before they leave the orchard, but more frequently in the curing house. After packing, the disease may spread throughout a box from one fruit to the next.

The conditions for the growth of a fungus such as this, are particularly the presence of moisture, warmth, and a suitable substance upon which to grow. In the Navel orange, a drop of water will often condense in the open end, and there the fungus finds a very suitable place for growth.

The best means of preventing the growth of the fungus in the fruits appear to be as follows: (1) Wrapping fruits in tissue paper, a means which, combined with some amount of ventilation in the boxes, has proved, within certain limits, valuable as a preventive of decay. (2) Careful destruction of decaying fruit (by deep burial or by fire) in the orchard or the packing house, since, by this means, the number of spores likely to be floating in the air will be greatly reduced. (3) This should be combined with disinfection of the packing houses, either by thorough drying, by whitewashing, or by burning sulphur therein.

Cultures of Nodule Bacteria.—Mr. Chittenden said that experiments had been carried out in Essex during the past year with cultures of nodule bacteria from America and Germany on beans, peas, lucerne, clover, etc., but in every case without yielding any increase in crop either in pot cultures, or in the field, in spite of the fact that, in every case the cultures were proved by means of control cultures to be alive, and capable of vigorous growth. Dr. Somerville said that this had been the experience throughout the country, just as with 'nitragin' a few years ago.

APPOINTMENT VACANT.

The post of Agricultural Instructor, under the Imperial Department of Agriculture, is vacant at Dominica. Candidates should be not more than thirty years of age, active, accustomed to ride, and with good experience in practical agriculture, especially cacao planting. Salary £130 per annum, quarters free, with £20 for horse allowance, and a small personal allowance, when travelling on duty. Applications, with full particulars as to age and experience, to be addressed to—

The Imperial Commissioner of Agriculture, Head Office, Barbados.

SUGAR INDUSTRY.

The Canadian Tariff and Molasses.

The Commissioner of Customs, Ottawa, in reply to a letter from a firm of sugar dealers at Barbados, writes as follows:—

Gentlemen,—I have the honour to acknowledge the receipt of your letters of the 21st. and 23rd. instant, with further reference to the entry of molasses, and of syrups and fancy molasses, so called.

The Department holds that molasses entitled to free entry, or to entry under Tariff item 441, is a by-product of muscovado sugar, and that the so-called fancy molasses is a different article, so far as its classification under the present Tariff is concerned, and is not entitled to free entry, nor to entry under Tariff item 441.

The polariscopic test of molasses to ascertain the percentage of cane sugar is by Clerget's method, and not by direct polarization. This system has been adopted by the Department, and has been in force since March 1904, under the authority of section 9 of the Customs Tariff, 1897. The tests of molasses mentioned in your letter as being 54 and 55 refer, no doubt, to tests by direct polarization.

It is considered that the limit of 52 degrees cane sugar (by Clerget's method) will cover all genuine molasses from Barbados. All samples are to be tested here, and any samples of genuine muscovado molasses found to test over 52 degrees cane sugar will be specially considered.

Samples of West Indian molasses have not been tested here for some time, but it is found necessary to resume the test for classification purposes. A sample of a recent importation from the West Indies shows no cane sugar, and is therefore dutiable at 3c. per lb. under Tariff item 440.'

Later information is contained in the following telegram, sent by the Commissioner of Customs, Ottawa, to the Chamber of Commerce at Barbados, on March 14, in reply to a telegram addressed to him by that body:—

Genuine muscovado molasses from British West Indies admitted free into Canada regardless of test.

Fancy molasses from British West Indies, testing not more than 52 degrees by Clerget's method, admitted free.

Fancy molasses testing over 52 degrees Clerget's dutiable about 4c. per Imperial gallon same as raw sugar.

It may be added that the Clerget test is a double polariscopic test by means of which, the percentage of saccharose is ascertained in the presence of invert sugar.

West Indian Seedling Canes in Queensland.

The *Annual Report of the Queensland Acclimatization Society* for 1905 contains an interesting account of the West Indian seedlings that have been imported into Queensland:—

In 1900, this society obtained a shipment of seedlings from the West Indies, which included the following varieties: B. 147, B. 156, B. 176, B. 208, B. 244, B. 306, D. 115, D. 116, D. 145, and D. 95. These varieties were specially selected by Mr. J. R. Bovell, F.L.S., F.C.S., under the auspices of the Imperial Department of Agriculture, and were the best of the seedlings then under cultivation.

Repeated mention has been made of the success of these canes, in previous numbers of the *Agricultural News* (Vol. III, p. 180; Vol. IV, p. 274), and an extensive distribution of these seedlings has been made by the society to the planters. The report comments upon the success of the seedlings, and mentions that it will be desirable for the society to arrange for another shipment of the best of the more recently raised varieties, as considerable advance has been made in the West Indies since 1900, the date of the last shipment. The following extracts concerning these imported canes are taken from information forwarded by the planters, and published in the society's report:—

The Colonial Sugar Refining Company at Cairns reports that B. 147 and B. 176 are 'promising,' having yielded 14.7 per cent. and 16.1 per cent. of 'possible obtainable cane-sugar' on new scrub soil of poor quality, as against the standard variety which yielded 14.3 per cent.

The manager at Ingham states, that B. 208 is still considered to be 'by far the best cane' out of these importations, and promises very well.

Dr. A. J. Gibson at Bingera plantation has prepared the following table, which gives the results obtained with six of these varieties:—

No.	Tons per acre.	Sucrose per cent.	Quotient of purity.
B. 208	69.6	22.2	92.9
B. 156	49.6	19.4	90.6
D. 306*	49.6	19.1	88.3
B. 147	34.8	19.7	92.4
B. 244	33.9	20.9	89.9
B. 176	33.5	19.1	91.8

From this, it will be seen that B. 208 has again given the largest yield of canes per acre, the highest percentage of sucrose, and the highest quotient of purity.

NOTES ON AGRICULTURE IN DOMINICA.

The following notes on the cultivation of the estates in the Lasoye District, Dominica, have been taken from a report furnished by Mr. J. Jones, the Curator of the Botanic Station in that island:—

The principal cultivation in this quarter is the lime, which thrives excellently. The land is probably well suited for other members of the citrus family. Cacao is not much grown, but where the land is well sheltered and well drained, it thrives well.

At Hatton Garden, I saw for the first time, some considerable fields of the spineless lime just beginning to bear. A defect of this variety appears to be its erect growth, causing it, when three or four years old, to form rather a heavy top, and so to be more easily uprooted by the wind than the spiny variety at that period of growth. Fruiting will rectify this, as the weight of the crop will bring the branches down, and give the trees a more shrubby habit. The old trees of the spineless variety at the Botanic Station have the same appearance as trees of the common kind, but the erect growth of the new type, when young, is very distinctive.

Experimental rubber cultivation is being carried on at Otley, Governor, and Hatton Garden. The plots of *Castilloa* and *Funtumia*, three years old, at the last-named estate, are excellent. In this district there are large areas of land which will probably prove to be suitable for rubber cultivation.

* This should probably be B. 306. [Ed. A.N.]



WEST INDIAN FRUIT.

A CURIOUS BANANA STEM.

A bunch of young bananas, with a peculiarly curved or twisted stem, has been forwarded to the office of the Imperial Department of Agriculture by the Hon. J. Sealy, M.D., through Mr. J. R. Bovell, F.L.S., F.C.S., Agricultural Superintendent, Barbados. Fig. 1 gives an illustration of this curious abnormality.

Dr. Sealy reports that five trees have shown this condition. In every instance, the bunch seems to stick at the base of the leaves, and the stem, elongating rapidly, becomes curved. In every case where the bunch has been allowed to remain on the plant, it has finally dropped off, through the rotting of the stem.

Probably the drying up of the bases of the leaves, owing to drought or disease, may contribute to this curious growth. In this case the rotting of the stem, above referred to by Dr. Sealy, is due to injuries received, when curvature is taking place, through the bunch sticking at the constricted bases of the leaves.



FIG. 1. BUNCH OF BANANAS SHOWING CURVED STEM.

THE WEST INDIAN FRUIT INDUSTRY.

In Vol. XXIX, Part 4, of the *Journal of the Royal Horticultural Society*, there is an interesting article on 'The West Indian Fruit Industry,' by Mr. W. G. Freeman, A.R.C.S., B.Sc., Superintendent of the Colonial Economic Collections, Imperial Institute, London.

Mr. Freeman does not profess to give a comprehensive account of the West Indian fruits, but rather to sketch the main features of the fruit industry, and the efforts which are being made, by agricultural workers, to improve it. At the present time, fruit forms the third export in value from the West Indies. By fruit here is meant only those fruits which

are exported in the fresh or preserved condition for human consumption.

Compared with sugar twenty years ago, fruit was then exported to the value of only about one-twelfth; to-day, however, its value is nearly equal to that of sugar. But, during that time, sugar has decreased in value by more than 50 per cent. whilst, on the other hand, fruit has increased by nearly 500 per cent.

Jamaica is, at present, the principal fruit-producing colony in the West Indies. In 1902-3, fruit to the value of nearly £1,250,000 was exported from that island, whilst the exports of all the other colonies together amounted to only about £14,000. Bananas are the principal fruit exported, followed at a great distance by oranges, grape fruit, and pine-apples. The bulk of the fruit trade of Jamaica goes to the United States of America. This is due, not only to the proximity of that island to the States, but to the well-organized and frequent service of fruit boats.

Writing on the introduction of plants, as one of the requirements for a successful fruit industry, Mr. Freeman mentions, as examples of fruit recently introduced into the West Indies, the mangosteen (*Garcinia Mangostana*) which has fruited in the Botanic Gardens at Trinidad, Jamaica, and Dominica; and the famous Malayan fruit, the Durian (*Durio Zibethinus*), which has been introduced into Dominica. How much the West Indies owe to plant introduction for their chief fruits may be judged from the following tables:—

(a) Native fruits.—

Pine-apple, sapodilla, cashew, sugar-apple, sour sop, mamee-apple, star-apple, and papaw.

(b) Introduced fruits.—

Banana, plantain, orange, grape fruit, shaddock, lime, mango, cherimoyer, breadfruit, tree tomato, avocado pear, pomegranate, and tamarind.

It will thus be seen that the banana and the various citrus fruits which constitute the whole of the present large fruit export, have been introduced, and are not native to the West Indies.

With the following remarks Mr. Freeman concludes his interesting article, the value of which is enhanced by illustrations of some of the principal West Indian fruits. He says: 'A successful fruit industry depends on the loyal co-operation of cultivator and transporter. Each can do nothing alone. The transporter cannot place fruit on the market to the best advantage unless it be intrinsically good, properly picked, graded, and packed; and all the efforts of the cultivator are rendered of no value if his carefully selected, well-grown, and properly packed fruit be transported under conditions which are far from the ideal.'

AGRICULTURAL SHOWS.

Dominica Agricultural Show.

The following Report of the agricultural show held at Dominica on March 2 and 3, 1906, has been contributed by Mr. F. E. Everington:—

The eighth Dominica agricultural show, under the auspices of the Imperial Department of Agriculture for the West Indies, and the Dominica Agricultural Society, was held at Melville Hall, Lasoye, on Friday and Saturday, March 2 and 3 last.

Owing to the movements of the R.M.S. 'Yare,' it had been necessary to postpone the exhibition for a week; and, although such a postponement generally proves disastrous, the show was a very good one.

There were 650 exhibits which were displayed in four marquee tents, and other tents were allotted for refreshment booths, and for the use of the committee.

Stalls for cattle, horses, sheep, etc., were constructed of bamboo, and a pretty effect was secured by attaching tree ferns to the tops of the bamboo posts, thereby creating a shady avenue.

Estate owners had been particularly requested to support the show, with the result that some interesting and instructive displays were made.

The St. Aroment estate exhibit was especially well put up, and Mr. J. R. Robin, of Marigot, sent a splendid collection of Dominica products comprising thirty different exhibits. Both Londonderry and Melville Hall estates made excellent displays. Mr. Skeat, of Londonderry, sent in a good sample of *Castilleja* rubber, which attracted much attention.

A noticeable exhibit of much interest, as showing the revival of an old Dominica industry, consisted of some hogsheads manufactured from native wood, split and sawn locally. The question of packages for lime juice, both raw and concentrated, is an important one to most of the Dominica planters, and now that the white troops have been removed from the West Indies, malt hogsheads are difficult to procure.

There was a large number of exhibits of starches made from cassava, yams, tannias, and other starch-bearing plants. If this industry could be encouraged, it would prove of great help to small proprietors, whose lands were originally planted in sugar-cane.

Owing to the proximity of the Carib Reserve, a goodly number of Caribs were present, and half of one of the tents was specially devoted to the display of the handiwork of these aborigines.

The exhibits in the vegetable section were excellent, the yams being generally large.

An interesting paper was attached to an exceptionally fine sample of concentrated lime juice (containing 104 oz. of citric acid to the gallon), sent from the Hampstead estate. The juice used in its preparation was allowed to settle after the essential oil had been distilled from it, and the supernatant clear juice was syphoned off—a method which is simple, economical, and thoroughly effective. Reporting on a shipment of 37 hhds. prepared in this way, Messrs. Ogston and Moore, Analytical Chemists, London, say, 'This is an excellent sample of juice. We do not think that lime juice can be better made.'

In reference to this juice, the following remarks by Messrs. Scrutton, Sons & Co. furnish a conclusive reply to the question frequently asked—'Does it pay to improve your juice?' Writing under date December 29, 1905, they say: 'There is no doubt about the advantage of making

good juice, as we have had practical evidence in the price obtained this year.' The only disappointment was the small number of people that took advantage of the special excursion by the R.M.S. 'Yare.' But, as the sea was rough, some intending visitors were doubtless deterred from undertaking the journey.

Antigua Agricultural Show.

The following account of the Antigua agricultural show has been furnished by Mr. R. H. Malone, the Honorary Secretary of the Antigua Agricultural Society:—

The Antigua agricultural show was held on February 22. On account of the very dry weather, it was not expected that the show would be a success; but, in spite of the lack of rain, the number of exhibits was greater this year than ever.

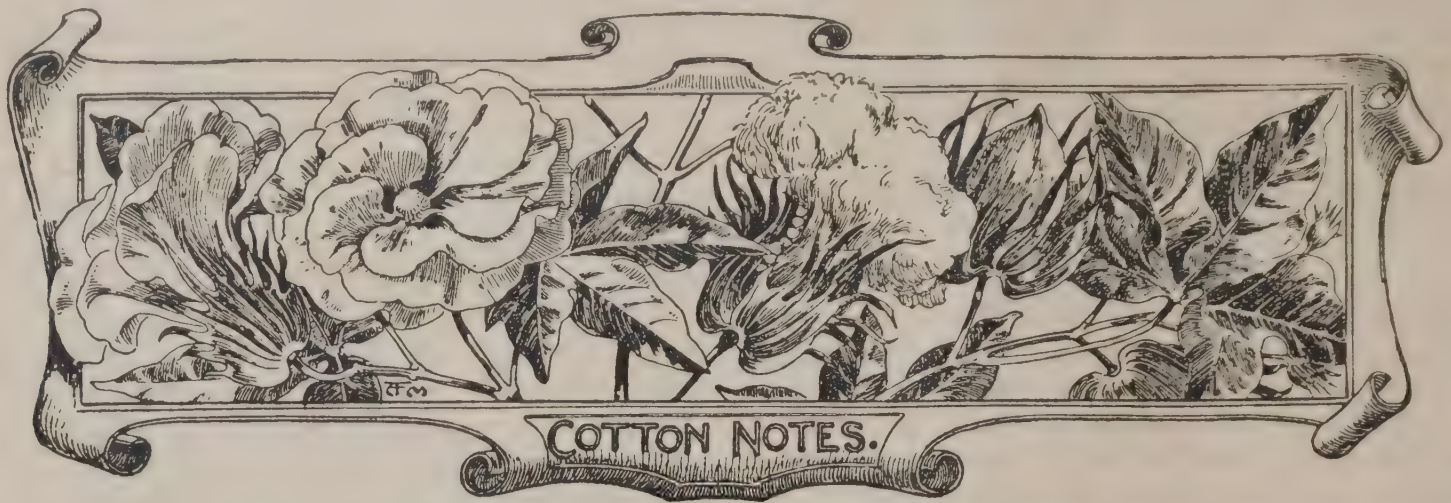
On account of the delay of the Royal Mail, the Hon. Sir Daniel Morris, the Imperial Commissioner of Agriculture, who had expected to attend the show, was unable to be present. The Hon. E. St. John Branch opened the show at 12 o'clock, and spoke commendingly of the number and quality of the exhibits. He particularly mentioned the splendid exhibits from the elementary schools, and the vegetables grown at the Presbytery gardens in St. John's.

The greatest improvement was shown in the cotton exhibits, which were more than twice as many as last year; and in the school exhibits, the number and quality of which were greatly in advance of last year's show. It may reasonably be expected that the school exhibits will be even better in 1907 than they were this year, as the late Sir C. C. Knollys has presented a cup, which the committee of the society decided might most appropriately be offered as a challenge cup for competition among the elementary schools, to be awarded for excellence in gardening work. The cup has been won, this year, by the Cathedral school. It will be offered for competition next year, and will become the property of the school winning it for three consecutive years.

The exhibits of the Imperial Department of Agriculture, which occupied an entire room, were extremely interesting. Diagrams and drawings were hung on the walls of the room. One diagram showed the fall in test of muscovado sugar caused by fermentation; another showed the rainfall in Antigua for the past thirty-two years; and a third, the advantage of soaking cane tops and cuttings in Bordeaux mixture before planting. Close to the last-mentioned diagram were bottles containing the constituents of Bordeaux mixture, and samples of well-prepared and badly-prepared Bordeaux mixture. There were drawings of mosquitos—the ordinary mosquito, the malarial mosquito, and the yellow fever mosquito, all shown in the various stages of their development. A collection of the current literature of the Imperial Department of Agriculture was exhibited in a glass case. Perhaps the most interesting exhibit in the room was one showing the various stages in broom making, from the uncleaned broom corn to the finished broom.

Some twenty-five varieties of yams, eddoes, cassava, sweet potatoes, etc., were exhibited from Scotts Hill and Skerrett's, and a glass jar with a large number of the little fish known as 'millions' was sent from the Botanic Station. These fish were obtained from Barbados, and are being distributed in Antigua for the purpose of reducing the number of mosquitos, by their habit of feeding on the mosquito larvae.

The exhibits, except the minor products, showed an increase in number in each class, from last year, the total number in 1905 being 578, and in 1906, 718.



SELECTION OF SEED FOR PLANTING.

Mr. Thomas Thornton, A.R.C.S., the Travelling Inspector in connexion with the Cotton Industry, furnishes the following interesting information with regard to the selection of cotton seed for planting during 1906:—

In the *Agricultural News*, Vol. V, p. 71, it was recommended that the cotton seed to be used for planting purposes next season should be well-developed seed with a tuft of green fuzz attached, and not the perfectly clean seed with a sharp spine.

The wisdom of this recommendation will be seen when it is realized that, on examining the seed-cotton from plants producing the clean black seed with a spine, it was found to yield but 23 per cent. of lint. The proportion of weak fibre also was as high as 42 per cent. of the lint, which is at least 28 per cent. more than is present in the seed which has been recommended for planting by the Imperial Department of Agriculture.

Dr. Watts has shown (*Agricultural News*, Vol. IV, p. 106) that when the clean black seeds were planted, they produced 33 per cent. seeds with like character; that is to say, about one third of the plants produced from these seeds came true to what may be regarded as the inferior black sort.

THE COTTON INDUSTRY.

The following notes on the cotton industry are taken from the *Textile Mercury* for March 17 last:—

A deputation from the British Cotton-growing Association, including Sir Alfred L. Jones, President; Mr. Arthur Hutton, Chairman; Sir Ralph Moor, Mr. J. E. Newton, Mr. J. C. Howarth, and Mr. Oliver, was received at the Colonial Office by Mr. Winston Churchill, M.P., who evinced the keenest interest in the movement, and expressed himself as being desirous to do all he possibly could to further the aims of the Association in all parts of the Empire.

The West Indies are making considerable strides in cotton cultivation, and the island planters are now said to be producing absolutely the finest cotton ever grown. The present crop will represent a value of £100,000 sterling. Some of it was sold on the Liverpool market last week for 1s. 8d. per lb., or 6d. per lb. more than the American Sea Island variety. Sir Alfred Jones has just received a letter from Sir Daniel Morris, K.C.M.G., D.Sc., Imperial Commissioner of Agriculture for the West Indies, stating that the area under cotton will be largely increased next year, and instancing one planter with 100 acres who has decided to plant 400 acres immediately. Referring specially to the

Northern Islands of the group, the Imperial Commissioner says that, despite the recent drought, there will be a good lot of cotton shipped. He also reports that some of the new Barbados cotton has obtained 16d. to 18d. per lb., while St. Vincent cotton has sold for 18d. to 20d. per lb.

The Association has adopted a novel method of stimulating public interest in the movement. From this West Indian cotton, handkerchiefs are being manufactured, which for fineness and softness of texture compare well with silk goods. Sir Alfred Jones has given an order for 2,000 of these handkerchiefs, which he proposes to distribute as gifts among the cotton operatives of Lancashire, believing that, in this fashion, a greater personal interest will be aroused in the scheme for producing British-grown cotton for British mills.

SEA ISLAND COTTON.

The following is a letter dated March 16, from Messrs. Wolstenholme & Holland to the Imperial Commissioner of Agriculture:—

Sea Island descriptions have been in good request during the past fortnight, and a fair business has been done at full prices.

Owing to the excellent preparation of West Indian Sea Island this season, buyers have taken all offerings, and Barbados cotton has realized from 16d. to 18d.; St. Vincent 18d. to 20d.; St. Kitt's 14½d. to 18d.; Antigua 15½d. to 19d.; Nevis 13d.; and Montserrat 15½d. For the very finest sorts, there is only a limited demand for fine lace purposes.

Latest reports from Charleston state that late sales almost exhausted the stock there, and only a limited supply is now on hand; but it must be borne in mind that spinners have bought sufficient Sea Island cotton at lower prices to carry them into next season.

According to the *Cotton Trade Journal* of March 3 last, the Sea Island cotton market, for the week ending March 2, closed steady, with a good demand for extra choice and below. The report from Valdosta states that the weather for the past two weeks has been more or less favourable to the farming interest. The farmers, however, are about two weeks behind in their preparation for the new crop. *There will be no increase in acreage.* On the contrary, it is anticipated that the acreage hitherto devoted to Sea Island cotton will be considerably reduced.

From New York there comes some mention of the desirability of better staples. A merchant, with experience both in Sea Island and in Egyptian cotton, is reported to have stated that the requirements are for the good grades, and that, while there may be no immediate demand for them, they are scarce enough to have sure value before long.

DISINFECTION OF COTTON SEED.

Mention has repeatedly been made in the *Agricultural News* (Vol. III, pp. 117, 149; Vol. IV, pp. 98, 101; and Vol. V, p. 103) of the desirability of disinfecting cotton seed before planting. This is a most important question, as the value of the following crop will depend to a large extent upon the absence of disease.

The economic importance of a plant disease depends on its distribution, its intensity, and the value of the plants attacked. Epidemics of fungoid disease which rapidly cause the death of their host, or otherwise endanger the value of the crop, may through repeated attacks, render the cultivation of certain plants impossible in a given locality.

That great loss of wealth has been suffered from diseases of plants, figures have been frequently adduced to prove. In Australia, wheat rust causes a loss of nearly £8,000,000 annually, while in India the loss from this cause is estimated at not less than £91,000,000. Ceylon suffered to the extent of probably over £12,000,000 by the coffee-leaf disease, which led to the ruin of the industry in that island. In some of the cotton-growing districts of the United States, 10 to 15 per cent. of the total crop has been lost owing to the occurrence of anthracnose.

Consideration of losses of sums of money like these, emphasizes the importance of any measures for preventing the spread of the fungoid diseases of cotton in the West Indies.

In order to combat any fungoid disease successfully, it is most important that its life-history should be first known, for then remedies can be applied at the weakest stage of its attack. The diseases of cotton have been investigated by officers of the Imperial Department of Agriculture, and experiments have been carried out with the view of obtaining remedies for the same.

These investigations show that it would be advisable to have all cotton seed to be used for planting purposes carefully hand-picked in order to remove any bad seeds, which would probably be weak or diseased; and, further, for the purpose of keeping diseases of cotton in check, all planters are strongly recommended to have all their cotton seed carefully disinfected (as well as selected) before planting, so as to prevent the germination of any spores which remain attached to the seed itself.

The disinfectant advocated by the Imperial Department of Agriculture for cotton seed is a 1 in 1,000 solution of corrosive sublimate (mercuric chloride); this may be prepared by dissolving 1 oz. of corrosive sublimate in 7 gallons of water. In view of the results of experiments that have been carried on during the past year, it is recommended that the seeds, after being hand-picked, should be soaked in this solution for twenty minutes, care being taken that they are thoroughly wetted. The seeds might then be taken out and washed in clean water for a few minutes, spread in a thin layer to dry, on a clean floor, or a clean canvas, in the shade. While drying, the seed should be turned several times, and when thoroughly dry it will be ready for planting, or it may be put into bags and kept for some time. A few days should elapse between the disinfection and the planting, as no seed should be planted without first being thoroughly dried.

In the case of seed shipped from one island to another for planting purposes, there would be a probability of introducing diseases into localities where, hitherto, they have been unknown, and therefore, it is strongly urged that all cotton seed should be disinfected before it is shipped.

The multiplication of large areas of plants of the same

kind increases the danger of epidemics, and therefore all planters of cotton are strongly advised to co-operate in these precautionary methods, so as to reduce the possibility of further spread of disease amongst their crops. It should be borne in mind that the wider the areas over which cotton is planted in these islands, the greater should be the care taken to prevent the spread of disease.

ST. VINCENT COTTON.

In a recent letter to the Imperial Commissioner of Agriculture, Mr. W. N. Sands, Agricultural Superintendent at St. Vincent, reports as follows:—

The account sales of the 117 bales of cotton shipped, in January and February last, to the British Cotton-growing Association have been received, and are very satisfactory to all concerned.

Only 1 bale has, so far, sold for less than 17*d.*, and this fetched 12½*d.* per lb. The very low price in this case was entirely due to the cotton being very badly prepared. Thirty-one bales sold at 20*d.* per lb.

To date (March 17), 101,686 lb. of lint have been ginned at the central cotton factory.

In a further letter dated March 31, Mr. Sands writes:—

In addition to the 117 bales of cotton already reported on, 69 bales have been sold, and the account sales received. Of these, 1 bale sold for 16*d.*, which was the only bale that sold for less than 18*d.*, and it is mentioned that this was the only bale that was not shipped to the British Cotton-growing Association. The total account sales received to date, are in respect of 186 bales which were sold as follows: 54 bales at 20*d.* per lb.; 61 bales at 19*d.* per lb.; 50 bales at 17½*d.* to 18½*d.* per lb.; 13 bales at 18*d.* per lb.; 6 bales at 17*d.* per lb.; 1 bale at 16*d.* per lb.; and 1 bale at 12½*d.* per lb.

The total amount of cotton ginned at the central cotton factory this season, to date, is 110,333 lb., or about 306½ bales.

There seems a probability that the acreage of cotton in St. Vincent will be largely increased next season as a result of the very favourable returns from the present crop. The increase will include several cultivations that will be started by planters who have not as yet grown cotton.

At the time of writing, the work of selecting and disinfecting seed for planting purposes was about to begin. Seed for this purpose was to be obtained from those estates that had produced cotton which sold for 20*d.* per lb.

THE CACAO INDUSTRY IN GRENADA.

In a comparison of the principal cacao-producing countries, the *Journal of the Society of Arts* for February 23 last, gives figures to show that the crop in Grenada for 1904 exceeded that of 1903 by only 76 tons, while Trinidad increased its output of cacao by 3,689 tons.

It is a little surprising, says the *Journal*, that Grenada, which owes its great prosperity entirely to cacao, and whose product is always in demand in the London market even when other sorts are unsaleable, does not extend its cultivation more rapidly.

There is no room to extend the cultivation of cacao at Grenada. Intensive cultivation over the area at present under cacao is needed, and it is to improved method rather than to increased acreage that Grenada must look for increased production in the future.

EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming, should be addressed to the Commissioner, Imperial Department of Agriculture, Barbados.

All applications for copies of the 'Agricultural News' should be addressed to the Agents, and not to the Department.

Local Agents: Messrs. Bowen & Sons, Bridgetown, Barbados. *London Agents:* Messrs. Dulau & Co., 37, Soho Square, W., and The West India Committee, 15, Seething Lane, E.C. A complete list of Agents will be found on page 3 of the cover.

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Agricultural News

VOL. V. SATURDAY, APRIL 14, 1906. No. 104.

NOTES AND COMMENTNS.

Contents of Present Issue.

The editorial in this number deals with the treatment of cotton seed to be used for planting, and again calls attention to the fact that the Imperial Department of Agriculture is prepared to supply, at cost price, specially selected and disinfected seed for planting in 1906.

On p. 115, correspondence is given relating to the Canadian Tariff and molasses, in which is shown the duty to be collected on West Indian molasses from muscovado sugar, and on fancy molasses.

Under 'West Indian Fruit' on p. 116, will be found an extract from an article on the 'West Indian Fruit Industry' by Mr. W. G. Freeman, who was formerly connected with the Imperial Department of Agriculture.

On p. 123 is given the report of the examiners on the science subjects taught at Harrison College. It will be seen that the results indicate that improvement is shown in general science, and that the high standard of excellence in agricultural science has been well maintained.

Accounts are given on p. 117, of the agricultural shows at Dominica, and at Antigua. The report of the distribution of prizes and Diplomas of Merit at Antigua will be found on p. 121.

The article on the 'Treatment of Anthrax' on p. 125, gives information as to the preparation of the vaccine and serum, which are used in inoculating for the prevention of this disease.

The Dominica agricultural show, from the account given on another page of this issue, appears to have been most successful. There were 650 exhibits, fully illustrating the many industries of this fertile island. In addition to the efforts of the local officers of the Imperial Department of Agriculture and the officers of the Agricultural Society, mention should be made of the assistance rendered by Mr. F. E. Everington, to whom, in a large measure, the success of the show was due.

Cotton Traffic in Antigua.

An Ordinance recently passed by the Legislative Council of Antigua, to regulate the local traffic in cotton, was signed by his Excellency the Acting Governor on March 15.

This Ordinance provides that no person shall sell cotton in the presidency of Antigua without first obtaining a 'license to sell,' and no person shall purchase cotton without first obtaining a 'license to purchase,' and it states the conditions to be observed in making application for such licenses. It further provides for the inspection of the records of the purchaser by the police or other officers of the Government, and states that licensed persons under the law, are to give all information and assistance in detecting breaches of the law.

Section 19 of the Ordinance indicates ways in which persons may become offenders under the Ordinance, and the penalty that may be inflicted, following a conviction before a District Magistrate.

Trinidad Government Farm.

In answer to a question asked in the Legislative Council of Trinidad as to what had been done to carry out certain recommendations made by the committee on the Government Farm, Mr. C. W. Meaden, the Manager, has prepared a series of replies which, together with the recommendations already referred to, constitute Council Paper No. 21 of 1906. The following are extracts from this paper:—

The cattle on the Government Farm have been divided into two herds, one of which will be used for breeding stock for work, and for beef production, while the other will be developed especially for dairy purposes.

The Short-horn and Red-Poll breeds are being used for crossing with the Zebu stock. Guernseys gave unsatisfactory results in the trials made, and the Short-horns have replaced them at the Government Farm. The calves from the crosses of Short-horn with Zebu, and Red-Poll with Zebu, have given satisfactory results, the latter especially so.

Horse breeding is followed to a limited extent only.

Experiments in breeding a strain of pigs suited to the needs of the colony are being carried on. Tamworths and Berkshires have been crossed, and a typical animal has been produced, which is, in every way, suited to the needs of the colony. The Poland-China breed has been introduced, but it is too soon to say what the results will be.

Manures for Cotton.

In the article on 'Manures for Cotton' on p. 102 of the previous issue of the *Agricultural News*, an account is given of experiments with crushed cotton seed, and cotton seed (cake) meal. By a transposition of figures in the table, 409 lb. of cotton seed (cake) meal is made to appear as the fertilizing equivalent of 177 lb. of crushed cotton seed. In the summary following the table, it is, however, correctly stated that 177 lb. of cotton seed (cake) meal is the fertilizing equivalent of 409 lb. of crushed cotton seed.

Praedial Larceny in Dominica.

Dominica's Ordinance No. 8 of 1905 'to make provision for the prevention of thefts of agricultural produce,' will come into effect on July 2 next, by proclamation of March 13, 1906, issued by Sir Robert Bromley, Bart., the Acting Governor of the Leeward Islands. The Ordinance is very exhaustive in its aims, and far-reaching in its penalties. It provides for the proper licensing of both sellers and buyers of protected produce, except an officer of the Imperial Department of Agriculture acting in his official capacity; or any person purchasing pods, beans, seeds, slips, or plants merely for the purpose of planting the same; or any one purchasing for domestic use only; or to any purchase pursuant to legal process.

Each offence against the Ordinance may be punished by a fine not exceeding £20, or imprisonment for a period of four months.

A list of licensed sellers and purchasers, and their places of business in each district, will be posted at the Police Station of that district, and published in the *Official Gazette* once in each year.

Antigua Agricultural Show.

The *Antigua Standard* for March 10, 1906, states that on Friday, March 2, Sir Robert Bromley, Bart., the Acting Governor, distributed the diplomas and prizes awarded by the judges at the agricultural show held on February 22.

The awards included quite a number of special diplomas and prizes, among them being one given by Mr. A. P. Cowley, of a year's subscription to the *Agricultural News* for the best school exhibit. This was awarded to Mr. Jacobs, the master of the Cathedral school, as was also the challenge cup presented by the late Sir C. C. Knollys, which will be retained by Mr. Jacobs for the first of three years' competitions.

After distributing the prizes, which numbered over 200, his Excellency in a few words expressed regret that he was unavoidably absent from the show, and spoke of the pleasure he felt on the information of competent judges as to the excellence of the exhibition. He emphasized the importance and value of such shows in a community wholly dependent on agriculture, as they exemplified what great things may be achieved by the aid of science. He concluded by congratulating all concerned in the show on their having made it a success.

Seeds and Plants, Jamaica.

A catalogue, recently issued, of the seeds and plants offered for sale by the Nurseries and Gardens of Norbrook Plantation, Constant Spring, Jamaica, contains a list of seeds and plants which are available for immediate use, and for which orders will be booked for future delivery.

The economic plants offered in this catalogue include fruits, spices, fibre plants, rubber plants, etc., suitable for cultivation in the West Indies. The following varieties of pine-apples are kept in stock: Abbaka, Black Jamaica, Curaçoa, Egyptian Queen, Red Spanish, Green Ripley, Red Ripley, Sam Clark or Ruby, Smooth Cayenne, and Sugar Loaf.

The ornamental and flowering plants include palms, roses, various aroids, crotons, begonias, orchids, ferns, etc., as well as cut flowers and foliage for decorations.

Royal Botanic Gardens, Ceylon.

A very interesting and well-illustrated guide to the Royal Botanic Gardens at Peradeniya, has been issued by the Curator, Mr. H. F. Macmillan, F.L.S., F.R.H.S. These gardens were established in 1821, twenty-five years after the arrival of the English in Ceylon, and six years subsequent to the final conquest of the Kandyan Kingdom. The present Director, Mr. J. C. Willis, D.Sc., M.A., F.L.S., was appointed in 1896, and under him, besides a native clerical staff, there are nine European officers, including an Entomologist, a Mycologist, a Scientific Assistant, and a Chemist.

'The gardens are at an elevation of about 1,600 feet above sea-level. The area is nearly 150 acres, and beautifully undulated. The climate is moist, hot, and very equable, the mean annual temperature being about 76° F., though as low as 55° F. is sometimes recorded in the early mornings in January and February. Rain falls, on an average, about 170 days in the year, with a total yearly average of 89 inches. February and March are the driest, and April and May the hottest months. The vegetation is purely tropical, being characterized by an abundance of climbing plants or lianas, palms, bamboos, screw-pines, orchids, ferns, etc., and lofty trees. Other striking tropical features are the great variety of bird, insect, and reptile life. Lizards or chameleons of diversified forms are everywhere, and snakes of numerous species abound, from the venomous cobra and repulsive polanga to the harmless, beautiful, green whip-snake, which lives mostly in trees or shrubs. With reasonable precautions, however, the snakes do not constitute an appreciable source of danger.'

By following this guide, the visitor would make a complete circuit of the gardens, and at each step would learn something interesting about the ornamental and economic trees and shrubs to be met with on the way.

The photographs with which the guide is illustrated are excellent, and add considerably to the value of the book as a souvenir.



INSECT NOTES.

Mole Crickets.

In previous numbers of the *Agricultural News* (Vol. II, pp. 104, 200, 298), and in the *West Indian Bulletin* (Vol. II, p. 349), accounts have been given of the mole cricket, where the methods in use for combating it have also been discussed.

The mole cricket occurs in most of the islands of the West Indies, and in certain of them—St. Vincent, St. Lucia, Dominica and Trinidad—it is well known as a pest.

Mole crickets live underground making their burrows in all directions, and eating off the roots of plants. The eggs are laid in these subterranean galleries, and the young and adults spend most of their lives in them. At night, however, they come to the surface and feed on tender plants. The underground burrows can be located by the surface openings, and frequently by the dead or dying plants, the roots of which have been eaten off.

On account of its habits the mole cricket is difficult to combat. Many methods have been tried, the cheapest and most effective of which is perhaps a poisoned bait similar to that used in Porto Rico, which is made of the grass known as 'Yerba dulce' and is prepared as follows:—

The Yerba dulce* plants are chopped into pieces about an inch in length and covered with Paris green or arsenic. Half an ounce of Paris green to every quart of the grass is a good proportion to use. This mixture should be thoroughly stirred, so that the poison should be evenly distributed.



FIG. 2. THE MOLE CRICKET.

Adult from above at left, from side at right.

In combating cut worms at Barbados (*Agricultural News*, Vol. IV, p. 378) a poisoned bait made by mixing 25 lb. bran with 1 lb. Paris green, and stirring in sufficient molasses and water to make a thick mash, has given excellent results, and would probably prove equally effective with the mole cricket.

In using a poisoned bait, it should be distributed in small quantities, at frequent intervals, throughout the

* This name does not appear in the 'Economic Plants of Porto Rico' by Cook & Collins, 1903. [Ed. A.N.]

infested fields. The bait may be placed on, or just below the surface of the soil near the plants. Clean cultivation is a great aid to the effectiveness of any remedial measure, as the removal of weeds deprives the insect of a large portion of its food, and the frequent stirring of the soil tends to fill up its burrows, and exposes the insect itself to the attacks of birds and other natural enemies.

Mole crickets that have eaten poisoned bait retire into their burrows to die, and the results are thus not readily seen. If, however, this method be followed for some time, it will be found effective, and the cost is very small. In the case of cutworms attacking cotton, already mentioned, the cost of the poisoned bait, and its application, was only about 20c. to 24c. per acre.

Carbon bisulphide, creolin, creosote, naphthaline, tobacco, and kerosene, have all been tried at the Porto Rico Experiment Station, but none have proved to be so cheap and effective as the poisoned bait of 'Yerba dulce.'

In a recent number of the *Port-of-Spain Gazette* a correspondent recommends the use of 'Green's Parasol Ant Destroyer,' a tea-spoonful of which is poured into each hole, and the hole is then plugged up. This (probably a preparation of carbon bisulphide) might prove effective, but would be likely to be very expensive.

EDUCATIONAL.

Agricultural Instruction in Elementary Schools.

In the report on the elementary schools, Barbados, for the year 1905, published in the *Official Gazette* of March 29, 1906, the Inspectors write as follows on the subject of agricultural instruction:—

The work in this important subject has been maintained during the year, and there are signs of progress. Fifty-one boys' schools and three girls' schools, the same as in 1904, presented children at the annual examinations in the object-lessons based on the text of the *Tropical Readers* and *Nature Teaching*. About one-third of these also showed either school gardens under cultivation, or plants growing in pots or boxes. The number of passes obtained was not as high as last year's figure, being only 674 as against 820, but the school gardens are decidedly better managed than before, and the number of them has increased to twenty-one. These received grants of implements from the Imperial Department of Agriculture; and twenty other schools received pots and boxes in which to cultivate plants. At the Bushy Park exhibition on December 5, it was generally acknowledged that the exhibits from the schools were of a higher standard than those at previous shows, and that they evinced more care and attention on the part of the children. A boy from St. Jude's won a prize for grafting, and the Society Boys' School, and Mount Tabor Boys' received Diplomas from the Commissioner of Agriculture for their exhibits.

It is stated that some difficulty has been found in inducing the teachers to take up this subject heartily. They are discouraged by the fact that, after experiencing reductions in salaries for teaching the ordinary subjects, they have been called upon to take up, in their schools, two other subjects, agriculture and drawing, for which they received no extra pay. That anything has been done by them in this subject of agricultural instruction, is to be attributed entirely to the encouragement and substantial assistance given by the Imperial Department of Agriculture. From the Legislature they have received no encouragement at all, although it is recognized to be of unquestionable advantage to the general community.

Science Teaching at Harrison College.

The following reports on the examinations in science at Harrison College, appeared in a recent issue of the *Barbados Official Gazette*:—

To the Secretary of the Local Examinations and Lectures Syndicate of the University of Cambridge.

Sir,—I have the honour to report, as follows, on the results of the examination of the Science Classes of Harrison College, Barbados.

Chemistry (Theoretical).—Six candidates sent in answers to this paper. All were good, and two of the six, excellent.

Chemistry (Practical).—Two papers were set in this subject. The easier one was taken by four boys, who all sent in excellent work in qualitative analysis. Six boys took the harder paper including volumetric analysis, and their work was equally good.

Botany.—Of the eight candidates only one was weak. The worst feature of the work was the general inability to produce intelligible sketches and diagrams.

Physiology and Entomology.—The answers were, on the whole, not quite so good. The weak points were chiefly in the questions on blood pressure, and on diet.

The results, on the whole, are entirely satisfactory, and show a great improvement all round.

One point may be improved, namely, the spelling of scientific words, in which several boys were very erratic.

I have, etc.,

(Sgd.) T. B. WOOD, M.A.,
Gonville and Caius College,
Cambridge.

Countersigned on behalf of the Syndicate,
J. H. FLATHER, M.A.,
Assistant Secretary.

To the Secretary of the Education Board, Barbados.

Sir,—I have the honour to send you my report on the examination in Agricultural Science at Harrison College, and trust that the results will be considered satisfactory.

Papers were received from seven candidates, and the marks obtained are returned as percentages of the maximum.

Belgrave ...	78	Parris ...	75
O'Reilly ...	78	Carter ...	63
Cozier ...	76	Walcott ...	63
Boon ...	58		

A high standard of excellence was attained, and there was a notable absence of bad mistakes. The questions on drainage and the plough were answered well by nearly every candidate.

In two cases, the information given as to fertilizers was incorrect, but the majority gave proof of a sound knowledge of the composition of manures, and their prices and rates of application.

The two practical questions on grasses and ensilage were well treated, but the description given of how to bud an orange would undoubtedly result in a large percentage of failures, if closely followed.

It is gratifying to find that the high standard of work in Agricultural Science at Harrison College which has been recorded in past years, has been so well maintained.

I have, etc.,

(Sgd.) H. H. COUSINS,
Island Chemist.

OFFICIAL CORRESPONDENCE.

The following official correspondence is published for general information:—

The Acting Governor of the Leeward Islands—to the Imperial Commissioner of Agriculture.

Government House,
St. Kitt's, March 15, 1906.

Sir,—I have the honour to transmit, herewith, copies of Resolutions passed by the Agricultural and Commercial Societies of St. Kitt's and Nevis with reference to the continuance of the Imperial Department of Agriculture for the West Indies.

I have, etc.,

(Sgd.) ROBERT BROMLEY,
Acting Governor.

The Honorary Secretary, Agricultural and Commercial Society, St. Kitt's—to the Acting Governor of the Leeward Islands.

St. Kitt's, February 28, 1906.

Sir,—I have the honour to inform you that at a special meeting of the St. Kitt's Agricultural and Commercial Society, held on February 26, the following Resolution was proposed by Hon. J. T. Manchester and seconded by Hon. S. L. Horsford:—

Be it Resolved :

'That this meeting hereby expresses its appreciation of the valuable assistance rendered the Sugar and Minor Industries of this island by the Imperial Department of Agriculture, and earnestly hopes that the Imperial Government will see its way to continue the Grant-in-aid to the Department on the expiry of the present term, so that its good work may be continued.'

This resolution was carried unanimously, and I was instructed to forward a copy to you for transmission to the Secretary of State for the Colonies.

I have, etc.,

(Sgd.) F. R. SHEPHERD,
Hon. Secretary,
Agricultural and Commercial Society, St. Kitt's.

The Chairman of the Agricultural and Commercial Society, Nevis, to the Acting Administrator, St. Kitt's.

Nevis, March 9, 1906.

Sir,—I have been requested to forward you enclosed copy of a Resolution unanimously adopted at a meeting of our Agricultural and Commercial Society held yesterday, and to ask you to transmit the same, through the usual channel, to His Majesty's Principal Secretary of State for the Colonies.

I have, etc.,

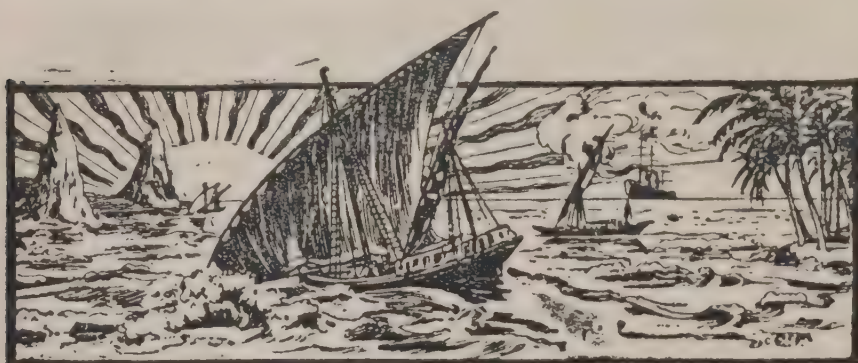
(Sgd.) C. ARTHUR SHAND,
Chairman,
Agricultural and Commercial Society, Nevis.

Copy of Resolution of the Agricultural and Commercial Society of Nevis.

Whereas the members of the Agricultural and Commercial Society of Nevis are anxious to place on record their thankful appreciation of the splendid results achieved by the Imperial Department of Agriculture since its initiation, and the noteworthy successes that have attended the efforts of that Department under the able and untiring administration of its Commissioner the Hon. Sir Daniel Morris, K.C.M.G., etc., in the development of the Sugar, Cotton, and other Industries throughout the length and breadth of the West Indies, and especially of the Cotton Industry in Nevis,

Be it resolved :

'That His Majesty's Government be forthwith apprised of the facts set forth in the preamble above, and at the same time be earnestly and respectfully requested, through His Majesty's Principal Secretary of State for the Colonies, to make such provision for the continuance of the Imperial Department of Agriculture as may be deemed adequate to continue the useful mission with which it was intrusted for the re-habilitation of this portion of His Majesty's Dominions.'



GLEANINGS.

The Agricultural Instructor at Nevis reports that the Aërmotor erected at Richmond Lodge has given satisfaction in the preliminary trials in ginning cotton and grinding foodstuffs, in spite of rather intermittent action due to light winds and occasional squalls.

The Curator at Dominica reports that close on 2,000 budded plants of lemons, Washington Navel oranges, and grape fruit have already been ordered for delivery, locally, at the close of this year. The prospects of the orange industry in the island are distinctly favourable.

Mr. J. Jackson, the Curator of the Botanic Station, Antigua, in a recent letter to the Imperial Commissioner of Agriculture, reports that *Bougainvillaea glabra*, var. *cypheri*, growing at the Botanic Station, has developed an exceedingly fine sport, the colour of which is magenta. Efforts are being made to propagate it.

According to the new West Indian Produce Association, whose headquarters are at Fenchurch Buildings, London, E.C., it is recommended to 'smoke imperially' as well as 'think imperially.' It is announced that West Indian cigars, and especially the well-known and highly appreciated 'La Tropical' and 'Golofina' and other brands, are on sale by the Association at reasonable rates.

A fine specimen of the Immortel (*Erythrina umbrosa*), so well known in Trinidad as a shade tree for cacao, is now in flower in a garden in Belleville, Barbados. It is a handsome wide-spreading tree about 50 feet in height, and just now, when, owing to the prolonged dry weather, everything is dry and burnt up, this Immortel tree with its masses of brick-red flowers, is a very striking and beautiful object.

At the meeting of the American Association for the Advancement of Science, held at New Orleans in December last, Mr. G. S. Fraps read a paper on 'The Effect of Climate on the Composition of Cotton Seed.' Observations made during two seasons showed that cotton seed meal from the western parts of Texas, where the climate is semi-arid, was richer in nitrogen than meal from the eastern part of the State. Texas cotton seed meal was considered richer than cotton seed meal from other sections.

According to the statement of the rainfall returns for Dominica during 1905, published in the *Official Gazette* for March 17, 1906, the highest rainfall for the year was 232.11 inches registered at Corona estate, and the lowest 46.07 inches at Macoucherie. The rainfall during the month of August was the heaviest, Layou Park registering 33.25 inches, but Macoucherie only 4.80 inches. The mean rainfall, based on returns from thirty-three stations, for the month of August was 16.86 inches, but for the month of February 4.32 inches; whilst for the whole year it was 118.93 inches.

A company for the manufacture of paper from bamboo fibre has been started in Trinidad. The machinery for this enterprise was due to arrive on Friday, March 2, by the S.S. 'Grenada.' The factory is to be at Gasparre Island, where a suitable property has been rented.

The Bermuda Government has voted the sum of £250 towards defraying expenses of experiments in tobacco growing at that place; and it is understood that a Jamaica manufacturer has decided to move his establishment to that island. On her last trip to Bermuda, the S.S. 'Beta' took four cigar makers from Jamaica.

The Hon. B. Howell Jones has recently imported two pure-bred black-faced Shropshire rams. The grandfather of one of these animals was sold lately for 309 guineas, which is believed to be the record price for black-faced rams. The two rams have been sent to plantation Hope. (Demerara *Argosy*, March 28, 1906.)

At a meeting of the Board of Management of the Jamaica Agricultural Society held on February 21 last, the subject of disease in cocoa-nut trees was referred to as follows:—'The Colonial Secretary forwarded a letter from Mr. G. P. Dewar reporting a serious disease among the cocoa-nut trees in Hanover. This disease was very contagious and was spreading very rapidly. Mr. Dewar inquired whether the Government would introduce a bill compelling the owners of trees attacked by the disease to cut them down, and so check its spread. The matter was referred to the Staple Product Committee.'

According to Gillespie Bros. & Co.'s New York Market Report for March 16, ginger continues to be the principal factor in the spice market. 'The continued upward movement of the European market, and the situation in Jamaica as reported by cable, make it almost impossible to attempt to predict what price Jamaica root will reach, or even to name quotations. London has advanced 2s. per cwt. within the past fortnight, and buyers here have advanced their ideas 1c. per lb., but were unable to obtain any ginger even at the advance. With the situation as it is to-day, it is possible to obtain almost any price within reason for the small parcels that are coming to hand. On to-day's market, we quote from 8c. to 8½c. per lb. for dark scraggy root, and from 10c. to 11½c. per lb. for the small white to bright bold ginger.'

The cultivation of the seedless orange has created a revolution in the orange-growing industry of the United States, says the *Florists' Exchange*. Since the early seventies, when it was introduced from Brazil by William Judson, United States Consul at Bahia, it has added \$43,000,000 directly, and \$60,000,000 indirectly to the taxable wealth of California. Mr. Judson heard of these peculiar trees when travelling on the Amazon River, and sent a native, who brought him some of the fruit and some of the shoots of the trees. He sent six shoots to the Department of Agriculture at Washington, but they excited no interest there, and in 1873 he sent four shoots to Southern California. One died from neglect, another was eaten by a cow, but the other two flourished. Sixteen seedless oranges were the crop of these two shoots, and they were carried from place to place for exhibition. It was feared that the fruit would be hard at the next crop, but it turned out better than before. Immense fields of oranges are the result of these two shoots first planted in Southern California.

TREATMENT OF ANTHRAX.

The following extract is taken from a paper on the 'Preventive Inoculation and the Serum Methods' read before the National Veterinary Association, at Buxton, in July 1905, by Mr. Stewart Stockman, M.R.C.V.S., Chief Veterinary Officer to the Board of Agriculture, London:—

In 1881, Pasteur demonstrated that if the *Bacillus anthracis* be incubated at a comparatively high temperature, 42.5° C., it ceased to form spores, and underwent an attenuation proportionate to the period of incubation at the unsuitable temperature. If subcultures were made from the original and incubated at 37° C., spores were again formed, but the second culture maintained the same degree of virulence as the one from which it was made. In this way cultures of graduated virulence can be obtained. Two vaccines of different virulence are used. The first vaccine consists of a culture which has undergone the attenuation process for twenty days; the second, which is, of course, stronger, has been attenuated for only twelve days. The dose for the smaller animals (sheep and goats) is $\frac{1}{8}$ c.c., and for the large $\frac{1}{4}$ c.c. The vaccine is injected subcutaneously behind the shoulder in the ox, and inside the thigh of the sheep. The interval allowed between the two operations is fourteen days. Immunity is established in about a month. It lasts for about a year on the average; that is to say, the inoculations must be repeated every year. One must, of course, take care when operating on a large herd or flock, that only those animals which have received the first vaccine get the second.

It is advised in France to immunize the animals in the spring so that they will be resistant before the hot weather comes on, when anthrax is more prevalent. On examining the returns for Great Britain of the past few years, I have failed to find a material seasonal difference in the incidence of anthrax. The effects of inoculation are slight fever, with occasionally an inconsiderable amount of tumefaction at the site of the operation. Sometimes, however, fatalities occur. When the latter are reckoned on a large number of inoculated animals the percentage is not high, 0.5 in sheep and 0.25 in oxen. Unfortunately, however, the majority may occur on one farm which causes one to hesitate before recommending a client to employ the method.

Statistics collected in France over a period of sixteen years show that inoculation by the Pasteur method was practised on 4,497,044 animals, of which 1,870,806 were reported upon. The mortality following upon the first vaccination was 0.31 per cent., and 0.24 per cent. after the second. The death rate for the rest of the year, that is to say, after the immunity might be considered to be established, was 0.36 per cent., where before employing the method, it was reckoned at 10 per cent. If, then, one calculates the total result on these figures, the benefit derived from the method is a reduction of the death rate from 10 per cent. to 0.91 per cent. from anthrax.

Statistics collected from the Buda Pesth Laboratory and the Pasteur Institute up to 1900 are given by Metchnikoff as a total of 11,381,867, with practically the same results as those mentioned above.

Chauveau demonstrated that anthrax cultures could be attenuated by cultivation under a high pressure of pure oxygen or atmospheric air.

Vaccines prepared in this way have been used in Chili with alleged success, but they have apparently a tendency to acquire increased virulence if kept too long. Only one virus

is inoculated at the dose of $\frac{1}{20}$ c.c. for sheep and $\frac{1}{10}$ c.c. for oxen. By such a method, one must expect to have a larger number of failures, but I take it to be an expedient compromise to suit the conditions of a country where the distances are great, the herds large, and the skilled operators few. Inoculation against anthrax is only to be advised where the annual losses from the disease render the method, with all its disadvantages, a business proposition. It should not, of course, be employed, for example, on pastures which are believed to be free from anthrax. Since an animal may be infected even fatally by the operation, it is advisable, where circumstances permit, to confine the inoculated until the immunizing process is complete, in order to avoid the possibility of a sick animal producing further contamination of the pastures.

The statistics above quoted are greatly to the credit of the Pasteur method. Unfortunately, however, there are others, which although on a much smaller scale, supply convincing proof that one cannot read into these figures, collected mainly from clinical observation, their full arithmetical significance. I refer particularly to the observations made in England in 1894, in which 6.6 per cent. of 225 sheep died from inoculation after the second operation, and an experimental test brought out the fact that immunity could not be counted on for four months.

(To be Continued.)

RUBBER TREES AT GRENADA.

The following particulars of India rubber trees found on estates in the island of Grenada, are contributed by the Agricultural Superintendent, in a letter dated March 29, 1906:—

In reply to your letter No. G. 352, I have the honour to inform you that I have now, to the best of my knowledge, seen all the rubber trees planted in this island.

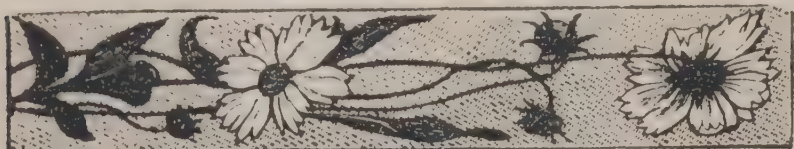
The majority of them are *Castilloa* trees, but there are a few Heveas. Nearly all the trees are young and grow very slowly, and it will be some years before any are ready to be tapped.

The *Castilloa* is, in most places, attacked by scale insects and the attendant soot fungus (black blight). As the trees get older, however, they throw off this to some extent, and its effect seems chiefly to be a retarding of the growth in the young stages. I am forwarding by this mail, for the inspection of the entomologist, a specimen of the scale which infests them. *

The Hon. W. H. Lascelles, who is at present in the island, has a number of trees which are doing well. Mr. Gay, at the Gouyave estate, has a few trees with one or two Heveas, and the Hon. G. S. Seton-Browne has a dozen or so about eight years old. In both cases these are growing together with cacao. Mr. W. G. Lang has a number of quite young trees at Tuilleries, and proposes this year to plant as much seed as he can obtain.

With regard to seed, a few of the *Castilloas* in the country districts will fruit this year, as will also a *Hevea* tree with Mr. Gay; but, in all cases, the owners require the seed for their own planting. Two of the Heveas at the Botanic Station are now in flower, and the three *Castilloas* are also flowering, so that a fair crop of seeds may be looked for. This, however, will not be enough to supply local demands.

* This insect has been identified as *Dactylopius citri*. [Ed. A.N.]



ST. VINCENT BOTANIC GARDENS.

The Agricultural Superintendent at St. Vincent has furnished the following notes:—

Of the four young Para rubber trees (*Hevea brasiliensis*, Meul.) established in the garden, two are flowering freely, and it is hoped that seed may be obtained in order to raise plants of this valuable economic tree for distribution. So far, no insect or fungoid diseases have been noticed on the established trees, whereas both the *Castilloa* and *Funtumia* rubber trees have been constantly attacked by scale and other insects.

The ordinary type of West Indian Periwinkle (*Vinca rosea*, L.) and its white variety are well known in the West Indies, and are common in some islands. At St. Vincent, both varieties are found growing in large masses, more especially in the areas devastated by the eruptions of the Soufrière in 1902-3. This is so noticeable, and the appearance of these plants, which are perpetually in flower, is so charming, that they might appropriately be termed the 'Flowers of the Ash.' In visiting this part of the island, I have frequently looked, but without success, for some intermediate variety, as both the rose and white varieties are found growing in such profusion and intermingled one with the other. Just recently, however, I have received a plant of the white variety, which, instead of having the light yellow eye, has a pretty and distinct purple one. This plant was kindly presented to the garden by Dr. C. W. Branch, who, I understand, brought it from St. Kitt's, where it is occasionally found, but is at all times very rare.

RUBBER CULTIVATION FOR SETTLERS IN THE TROPICS.

The following notes, on the cultivation of rubber by private individuals, are taken from the February issue of *Tropical Life*. They might prove of interest to young men who have a little capital at their command:—

With the present demand for cultivated rubber, many young men, at present at home, with £2,000 to £3,000, and unable to live on the interest of so small an amount, could do very much worse than take up the cultivation of rubber on scientific lines in one of the British colonies, where the rubber tree thrives. Such private cultivators need not fear that the industry will prove unremunerative to them, provided they start a carefully chosen and well-equipped estate themselves, and do not buy one already planted by some one else. The reason is plain. When a man plants his own trees, he knows it is properly done. The seeds are started in the nursery, and when planted out, the spaces are carefully regulated and adhered to throughout, so that he is sure when the trees are full-grown that they will all have the same area in which to develop. The seedlings will be planted with care, and as the trees grow up, he will grow with them, and learn to know their tricks and ailments, and knowing this, will train and cure them. Or, if they die, he will at once replace them, with the result that when his estate is ten years old he will know almost to a pound what his yield will be, and that yield will be worth him three times as much as it would if the estate had been started by another man. The prospective rubber planter must mean business,

and be determined to stick to what he has begun. He must not expect to grow rich through sheer good luck, and without hard work. He will succeed provided:—

(1) That he secures good land at a moderate price.
(2) That he studies the matter thoroughly, and sees that no planting out takes place except when he is there to superintend.

(3) That when the estate is coming along, or is fully grown, he keeps a steady watch over it, and does not let it go back through the trees dying, and not being replaced, or over-growing one another.

(4) That he is always careful to keep himself well informed both as regards the latest improvements in cultivation, and also as regards the distribution and consumption of the article. This latter is most important, as it enables the producer to supply the rubber that best meets the requirements of the consumer, and does not compel the consumer to take only the rubber that the second-rate planter turns out.

Before making a start, it is strongly recommended that a trip should be taken to the place selected, in order to study the industry on the spot, and the life it will involve. It is better to lose £100 on such an expedition, than all one's capital in an undertaking that nature never intended one man to follow no matter how remunerative it may prove to another. But even the £100 will not be lost, for the amount of experience that can be picked up on such a journey will be most useful in after life.

THE INSTITUTE OF COMMERCIAL RESEARCH IN THE TROPICS.

This institute is attached to the University of Liverpool. Its objects, as stated by the quarterly journal for January 1906, are as follows:—

(1) Collecting and tabulating all kinds of information regarding raw products, natural resources, trades, industries, and economic conditions, which can be of service either to commerce, or to science; (2) studying the botany, zoology, geology, ethnology, meteorology, and physiography of tropical countries, more particularly in their relation to the development of British commerce; (3) investigating all kinds of scientific problems which arise in connexion with trade and industry; (4) training experts in the various branches of applied science concerned; and (5) supplying scientific information and advice to all interested in commerce.

The means adopted to effect these objects are: Scientific and exploratory expeditions; the establishment of a bureau in Liverpool, where the latest scientific and commercial information may be obtained; research work in the laboratories of the city, and of the University, by a staff of experts; the preparation and publication of reports, returns, pamphlets and monographs; the delivery of lectures and addresses; correspondence and exchange with Government departments, and learned societies, both at home and abroad.

It is stated that arrangements are being made to despatch an expedition to the British Colonies on the West Coast of Africa to investigate several scientific problems of the utmost importance from a utilitarian point of view. Special attention will be devoted to rubber, timber, pulp, and oil.

Co-operation has been arranged with scientific expeditions, either private or under the auspices of similar bodies, in the following parts of the world: The Amazon, Ceylon, Uganda, Bolivia and Western Brazil, British and Spanish Honduras, the Red Sea, and the Congo.

WEST INDIAN PRODUCTS.

Drugs and Spices in the London Market.

The following report on the London drug and spice market for the month of February, has been received from Mr. J. R. Jackson, A.L.S. :—

Though the business in drugs and spices has not been very brisk during the month of February, there has been an indication of a general improvement in trade, and an upward tendency in some well-known drugs, none of which, however, affect the West Indies except, perhaps, the continued scarcity of grey Jamaica and Lima-Jamaica sarsaparilla, both of which remain extremely scarce.

GINGER.

At the early sales in the month, no Jamaica was offered, and of Cochin and Calicut, there were but small supplies, and few sales were effected. On the 14th. of the month, 95 packages of Jamaica were offered, and bought in at from 41s. to 55s. Fair washed rough Cochin was bought in at 32s.; privately rough Calicut was disposed of at 27s. 6d. to 28s., and small medium native cut at from 44s. to 46s. On the 21st., still no Jamaica was offered, but nearly 1,000 packages of Cochin and Calicut were put up, and 175 bags were sold previously to the sale. Medium cut Cochin was bought in at 65s., small cut at 50s., native cut at 45s. to 50s., and good bold rough Calicut at 35s. On the last day of the month, 20 barrels of Jamaica were offered, 16 of which sold at 60s. for good middling, and 50s. to 54s. for good ordinary. Ninety bags of Cochin were disposed of, ordinary washed rough Cochin being bought in at 27s., native cut at 44s., and limed Japanese at 26s.

NUTMEGS, MACE, AND PIMENTO.

At the first sale on the 7th., nutmegs had slightly advanced over the previous month. A week later, the market was firm, an advance of 2d. to 3d. being paid privately, owing, it was said, to the shortage in the crops both in the East and West Indies. Little or no change occurred to the end of the month. Mace was very firm at the beginning of the month, and at the sale on the 14th. but little was offered. Good West Indian was quoted at 2s. to 2s. 4d.; fair, 1s. 8d. to 1s. 10d.; and ordinary, 1s. 6d. per lb. At the concluding sales no change occurred. Of pimento, there is but little to report. Fair, mixed with a few blacks, was quoted at 2½d., and grey at 2½d. per lb.

ARROWROOT.

At the first sale on the 7th., 370 barrels of St. Vincent were offered and bought in at 2¼d. to 2¾d. per lb. for fair to good manufacturing. A week later, some small sales were made at 2d. per lb. On the 28th., there was a better demand, the quotations being 2d. for good manufacturing St. Vincent at auction, and 2d. to 2½d. at private sales. Good Natal in cases was bought in at 4½d.

SARSAPARILLA.

At the auction on the 1st., higher prices were demanded than in the previous month. Of grey Jamaica, only 11 bales were offered and disposed of at 1s. 9d. for good grey fibrous to partly rough, 1s. 8d. being paid for sea-damaged. For good Honduras 1s. 1d. was refused, 1s. 6d. being the lowest price fixed. A week later, the small quantity of grey Jamaica in hand was firmly held at 1s. 10d. At the auction on the 15th., the extreme scarcity of genuine grey Jamaica was emphasized by the fact that as much as 2s. per lb. was asked for it, besides which there was but little or no Lima-Jamaica offered. Of native Jamaica, only 12 bales were put up, all of which were sold at from 10d. to 11d. for pale

yellow to red, part of which was sea-damaged. At the last auction on the 22nd., it was reported that 12 bales of native Jamaica were all that had arrived during the week, and that the Crutched Friars warehouse was absolutely empty both of grey Jamaica and Lima.

OIL OF ORANGE, OIL OF LIME, MUSK SEEDS, KOLA, TAMARINDS, AND ORANGE PEEL.

Of other West Indian products that have appeared in the market during the month, may be mentioned oil of orange from Jamaica, of which 4 barrels of hand-pressed sweet orange were disposed of at 7s. 7d. per lb., and 1 barrel of bitter at 6s. 8d. At the close of the month, good bitter Jamaica orange oil in barrels was offered, and disposed of at from 8s. to 8s. 3d. per lb. Oil of lime at the auction on the 14th. was reported scarce, only 2 cases of West Indian distilled being offered, which realized 1s. 5d. to 1s. 6d. A parcel of musk seeds of fair flavour from St. Lucia was offered in the early part of the month, and bought in at 5d. per lb. In the middle of the month, 12 packages of West Indian kola nuts of fair quality were offered and sold at from 3¼d. to 3½d. per lb. Orange peel of good quality has been offered in large supplies during the month at prices from 7d. to 8d. per lb. for fine bright thin Tripoli strips, but there has been little or no demand.

THE SELECTION OF COCOA-NUTS.

The following note on the proper selection of cocoa-nuts has been taken from the *Indian Review* for January last. It has reference to the annual report for 1904 of the Curator of the Botanic Station in the Seychelles, who makes the following interesting observations on the difference between the cultivated Ceylon and the uncultivated Seychelles trees :—

Both belong to the same variety of plants, the only difference being that one is selected with a view to increase the size of the nuts, and to reduce the percentage of the envelopes, and the other is left to itself without selection.

The thickness of the meat has been found by examination to be the same in both nuts, but the diameter of the Ceylon nut being about three times greater than the diameter of that grown in the Seychelles, the former will produce twice as much copra as can be obtained from the Seychelles variety. This result has been obtained in the same soil, under the influence of the same climate, and is entirely due to selection.

It is probable that the trees which produce very small nuts have less requirements than those which produce bigger nuts, and that varieties which produce big nuts normally, will bear smaller nuts if they are starved out. But when one thinks of the very trifling amount of plant food which is removed from the soil by cocoa-nut cultivation, there seems to be no difficulty in supplying the elements which are required to a greater extent by the big-nut varieties. The planter must choose between having small nuts without trouble, and having double the crop by using proper methods of cultivation and selection.

DEPARTMENT NEWS.

The Imperial Commissioner of Agriculture embarked on an official visit to St. Vincent in S.S. 'Oruro' on Tuesday, April 3, and attended a special meeting of the Agricultural and Commercial Society at the Court House, Kingstown, on April 4. The Imperial Commissioner returned to Barbados in S.S. 'Sibun' on Thursday, April 5.

MARKET REPORTS.

London,—March 16, 1906. Messrs. KEARTON, PIPER & Co.; Messrs. E. A. DE PASS & Co.; 'THE WEST INDIA COMMITTEE CIRCULAR,'; 'THE LIVERPOOL COTTON ASSOCIATION WEEKLY CIRCULAR,' March 9; and 'THE PUBLIC LEDGER,' March 10, 1906.

ALOE—Barbados, 15/- to 60/-; Curaçoa, 17/- to 60/- per cwt.
ARROWROOT—St. Vincent, 1½d. to 2d. per lb.
BALATA—Sheet, 1/4 to 1/11; block, 1/4 to 1/4½ per lb.
BEES' WAX—£7 7s. 6d. to £7 12s. 6d. per cwt.
CACAO—Trinidad, 52/- to 60/- per cwt.; Grenada, 47/- to 52/- per cwt.

CARDAMOMS—Mysore, 7½d. to 3/- per lb.

COFFEE—Jamaica, good ordinary, 39/- to 41/- per cwt.

COTTON—West Indian, medium fine, 6.50d.; West Indian Sea Island, medium fine, 13d.; fine, 14d.; extra fine, 15½d. per lb.

FRUIT—

BANANAS—Jamaica, 4/6 to 6/- per bunch.

GRAPE FRUIT—8/- to 10/- per box.

ORANGES—Jamaica, 6/- to 8/- per box of 176-200.

FUSTIC—£3 10s. to £4 5s. per ton.

GINGER—Jamaica, 48/- to 52/- per cwt.

HONEY—Darkish to good clear, 19/- to 25/- per cwt.

ISINGLASS—West Indian lump, 2/1 to 2/4; cake, 1/1 to 1/2 per lb.

KOLA NUTS—4d. to 6d. per lb.

LIME JUICE—Raw, 10d. to 1/2 per gallon; concentrated, £17 15s. to £18 per cask of 108 gallons; hand-pressed, 2/3 to 2/6 per lb. Distilled Oil, 1/5 per lb.

LOGWOOD—£4 to £4 15s.; roots, £3 10s. to £4 per ton.

MACE—Good pale, 1/10 to 1/11; fair red, 1/6; broken, 1/2 per lb.

NITRATE OF SODA—Agricultural, £11 7s. 6d. per ton.

NUTMEGS—70's, 1/-; 90's, 8½d.; 132's, 6½d. per lb.

PIMENTO—Fair, 2½d. per lb.

RUM—Jamaica, 2/1 per proof gallon; Demerara, no quotations.

SUGAR—Yellow crystals, 14/6 to 17/- per cwt.; Muscovado, 15/- to 15/6 per cwt.; Molasses, 11/- to 15/- per cwt.

SULPHATE OF AMMONIA—£12 7s. 6d. per ton.

Montreal,—January 18, 1906.—Mr. J. RUSSELL MURRAY. (In bond quotations, c. & f.)

COCOA-NUTS—Jamaica, \$27.00 to \$29.00; Trinidad, \$25.00 to \$26.00 per M.

COFFEE—Jamaica, medium, 10c. to 11c. per lb.

GINGER—Jamaica, unbleached, 7½c. to 10c. per lb.

MOLASCUIT—Demerara, \$1.00 per 100 lb.

MOLASSES—Barbados, 29c. to 30c.; Antigua, 24c. per Imperial gallon.

NUTMEGS—Grenada, 110's, 18c. per lb.

ORANGES—No quotations.

PIMENTO—Jamaica, 5½c. per lb.

SUGAR—Grey crystals, 96°, \$2.00 to \$2.15 per 100 lb.

—Muscovados, 89°, \$1.50 to \$1.65 per 100 lb.

—Molasses, 89°, \$1.35 to \$1.50 per 100 lb.

—Barbados, 89°, \$1.45 to \$1.70 per 100 lb.

New York,—March 16, 1906.—Messrs. GILLESPIE BROS. & Co.

CACAO—Caracas, 11½c. to 12c.; Grenada, 10¼c. to 10¾c.; Trinidad, 10¾c. to 11½c.; Jamaica 9¾c. to 9½c. per lb.

COCOA-NUTS—Jamaica, \$24.00 to \$25.00; Trinidad, \$23.00 to \$24.00 per M.

COFFEE—Jamaica ordinary, 8¼c. to 8½c.; Black River, 8¾c. to 9c.; Manchester 9c. to 10½c. per lb.

GINGER—Dark scraggy root, 8c. to 8½c.; small white to bright bold, 10c. to 11½c. per lb.

GOAT SKINS—Barbados, Dominica, and Antigua, 59c. to 61c.; Jamaica, 62½c.; St. Kitt's, 51c. per lb.

GRAPE FRUIT—Jamaica, \$5.00 to \$8.00 per barrel; \$3.00 to \$4.50 per box

MACE—30c. to 35c. per lb.

NUTMEGS—West Indian, 80's, 25c.; 90's, 21c.; 100's, 19c.; 110's, 16½c. per lb.

ORANGES—Jamaica, \$4.75 to \$5.50 per barrel; \$2.25 to \$2.75 per box.

PIMENTO—4¾c. per lb.

PINE-APPLES—No quotations.

SUGAR—Centrifugals, 96°, 3.52c. to 3.55c.; Muscovados, 89°, 3.02c. to 3.05c.; Molasses, 89°, 2.77c. to 2.80c. per lb.

INTER-COLONIAL MARKETS.

Antigua,—March 30, 1906.—Messrs. GEO. W. BENNETT BRYSON & Co., LTD.

SUGAR—\$1.40 to \$1.50 per 100 lb.

MOLASSES—16c. per gallon.

Barbados,—April 7, 1906.—Messrs. T. S. GARRAWAY & Co., and Messrs. JAMES A. LYNCH & Co., March 31, 1906.

ARROWROOT—St. Vincent, \$3.80 to \$4.25 per 100 lb.

CACAO—\$11.50 per 100 lb.

COCOA-NUTS—\$10.00 per M. for husked nuts.

COFFEE—\$10.50 to \$11.75 per 100 lb.

HAY—\$1.00 to \$1.10 per 100 lb.

MANURES—Nitrate of soda, \$65.00; Ohlendorff's dissolved guano, \$55.00; Cotton manure, \$48.00; Sulphate of ammonia, \$75.00; Sulphate of potash, \$67.00 per ton.

MOLASSES—15c. per gallon.

ONIONS—\$3.00 to \$3.50 per 100 lb.

POTATOS, ENGLISH—Nova Scotia, \$1.92 to \$2.00 per 160 lb.

RICE—Ballam, \$4.40 to \$4.70 per bag (190 lb.); Patna, \$2.96 to \$3.25; Rangoon, \$2.65 to \$2.75 per 100 lb.

SUGAR—Muscovados, 89°, \$1.45; crystals, 96°, \$1.65 to \$2.10 per 100 lb.

British Guiana,—March 28, 1906.—Messrs. WIETING & RICHTER.

ARROWROOT—St. Vincent, \$8.00 per barrel.

BALATA—Venezuela block, 25c.; Demerara sheet, 38c. per lb.

CACAO—Native, 13c. to 14c. per lb.

CASSAVA STARCH—\$4.25 per barrel.

COCOA-NUTS—\$10.00 to \$12.00 per M.

COFFEE—12c. to 13½c. per lb.

DHAL—\$5.50 per bag of 168 lb.

EDDOES—96c. to \$1.44 per barrel.

ONIONS—Lisbon, 4c. per lb. (ex store).

PLANTAINS—12c. to 40c. per bunch.

POTATOS, ENGLISH—\$2.00 to \$2.40 per barrel.

POTATOS, SWEET—Barbados, \$1.08 per bag.

RICE—Ballam, \$4.90 per 177 lb.; Creole, \$4.00 per bag (ex store).

SPLIT PEAS—\$5.65 to \$5.70 per bag (210 lb.).

TANNIAS—\$1.32 per barrel.

YAMS—White, \$2.16; Buck, \$2.16 to \$2.40 per bag.

SUGAR—Dark crystals, \$1.90 to \$2.00; Yellow, \$2.30 to \$2.40; White, \$3.20 to \$3.39; Molasses, \$1.80 to \$1.90 per 100 lb. (retail).

TIMBER—Greenheart, 32c. to 55c. per cubic foot.

WALLABA SHINGLES—\$3.00, \$3.75, and \$5.25 per M.

Trinidad,—March 30, 1906.—Messrs. GORDON, GRANT & Co.; and Messrs. EDGAR TRIPP & Co.

CACAO—Ordinary to good red, \$11.00 to \$11.25; estates, \$11.50 to \$11.75 per fanega (110 lb.); Venezuelan, \$11.60 to \$12.25 per fanega.

COCOA-NUTS—\$20.00 per M., f.o.b.

COCOA-NUT OIL—75c. per Imperial gallon (casks included).

COPRA—\$3.10 to \$3.25 per 100 lb.

DHAL—\$4.50 to \$5.25 per 2-bushel bag.

MOLASSES—18c. per gallon.

ONIONS—\$2.00 to \$2.50 per 100 lb. (retail).

POTATOS, ENGLISH—\$1.20 to \$1.50 per 100 lb.

RICE—Yellow, \$4.70 to \$5.00; White, \$5.00 to \$5.75 per bag.

SPLIT PEAS—\$4.90 to \$5.00 per bag.

SUGAR—Yellow crystals, \$2.00 to \$2.25; molasses, \$1.75 to \$2.00 per 100 lb.



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Hurricane Insurance.

MANY of the readers of the *Agricultural News* are aware that, for some time past, the matter of insurance against the effects of hurricanes has been under consideration.

The Hon. H. Hesketh Bell, C.M.G., then Administrator of Dominica, issued a memorandum in July of last year, intended to show that, in view of the fact that hurricanes were not of so frequent occurrence in the West Indies nor so serious in the amount of damage done as had been generally supposed by those unacquainted with West Indian conditions, underwriters might safely undertake the risk in such a class of insurance.

Matters have now so far progressed that an insurance firm, Messrs. Henry Head & Co., 27, Cornhill, has made arrangements for issuing hurricane insurance, and a representative of the firm, Mr. Christopher Head, is at present in the West Indies for the purpose of submitting to planters, and others, the scheme proposed, with a view to making it better understood. He will receive and forward to his principals any suggestions of modifications to the scheme, which may be made to render it more useful or more acceptable to those for whose use it is intended.

The scheme, as it now stands, provides that insurance may be effected on buildings, cultivations (except bananas), and crops, at the rate of 1½ per cent. (30s. per cent.), with ½ per cent. additional for insurance against earthquakes and volcanic eruptions. or 2 per cent. for an inclusive insurance. On sugar estates the buildings alone may be insured at the rate of 1 per cent., provided they are of approved design.

It will be seen from this that the underwriters are prepared to insure buildings of all sorts; also cultivations of canes, cacao, cotton, tobacco, rubber, arrowroot, coffee, oranges, cocoa-nuts, vanilla, limes, and spices; in fact, cultivations of all kinds except bananas.

The scheme proposed was explained in a circular recently issued by Messrs. Henry Head & Co., from which the preceding rates have been taken, and in which, also, the reserve or 'franchise' is explained. It is stated that, in case of a claim arising from damage done by a hurricane, 'The underwriters would pay only the excess of 5 per cent. on the total value insured on any estate.' As an example, it is stated that on an estate insured for £3,000 no claim would be paid in case of damage by a hurricane unless such damage exceeded £150, and then the amount to be paid would be only the amount of the damage over and above £150.

It is further stated that 'the insurance would be subject to average, that is to say, in the event of an estate not being insured at its full insurable value, the assured would be able to recover only the proportion of the loss that the sum insured bore to the total value of the estate.' This, however, is the customary 'average' clause to be found in all marine and similar insurance.

The reserve or 'franchise' mentioned above was the subject of discussion at a special meeting of the Barbados Agricultural Society which was held on April 17, for the purpose of discussing the matter of hurricane insurance. At that meeting it was shown that on six estates in Barbados the damage done by the hurricane of 1898 was £160, £143, £150, £145, £95, and £158, respectively, making a total of £851. If the owner of these estates had had them insured at £3,000 each, he would have paid a premium of £45 per annum on each estate, according to the scheme now under consideration, while he would have received only £18 in insurance from the entire number.

It was pointed out by the chairman and others present that this reserve or 'franchise,' as it is called, was too much; and it was further suggested that the rate of $1\frac{1}{2}$ per cent. was too high.

In reply to these objections, Mr. Head stated that his firm had not intended to offer insurance against small losses, but rather to furnish a plan to provide against disasters, and that the rate was now lower than it could be if no franchise or reserve were maintained. He further stated that he had obtained concessions from his firm in the matter of insurance of estates valued at over £2,000, by being allowed to offer a slightly lower rate of premium.

When it is remembered that there have been no careful statistics from which the underwriter could learn the exact nature of the risks in hurricane insurance, it can hardly be wondered at that the first plan submitted should not be perfect. The great

point is that matters have now so far progressed that a definite scheme has been submitted for consideration. Messrs. Henry Head & Co. seem to be anxious to establish hurricane insurance on an equitable basis in such a way as to be advantageous both to the assured and to the underwriter, and will, no doubt, be glad to receive suggestions from those interested.

It must be borne in mind that there is at present no rivalry or competition for this class of insurance, and it must be made attractive to the underwriters for them to take it up, in any degree. At the same time it must appeal to planters and others in the West Indies as an investment that will give sufficient return to protect them from loss when hurricanes damage the crops, cultivations, or buildings insured.

It is greatly to be hoped that planters and others in these islands will interest themselves in this matter, and give their best consideration to the scheme proposed, with a view to making practical suggestions that will tend to remove any difficulties in the way of the working of hurricane insurance.

The following table of valuations was sent out by Messrs. Henry Head & Co. in connexion with the circular already mentioned. In addition to the values given herewith, a scheme is now in preparation, dealing with the insurable values of canes and cotton at different stages of growth:—

	One year old.		Two years old.		Three years old.		Four years old.		Five years old and upwards.	
	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.
Limes		6	1	0	2	0	3	6	5	0
Cacao		6	1	0	2	0	3	6	5	0
Oranges (budded)	3	6	5	0	7	0	10	0	14	0
Oranges		6	1	0	2	0	3	6	5	0
Rubber		6	1	0	2	0	3	6	5	0
Nutmegs	1	0	3	0	5	0	8	0	10	0

APPOINTMENT VACANT.

The post of Agricultural Instructor, under the Imperial Department of Agriculture, is vacant at Dominica. Candidates should be not more than thirty years of age, active, accustomed to ride, and with good experience in practical agriculture, especially cacao planting. Salary £130 per annum, quarters free, with £20 for horse allowance, and a small personal allowance, when travelling on duty. Applications, with full particulars as to age and experience, to be addressed to—

The Imperial Commissioner of Agriculture, Head Office, Barbados.



SUGAR INDUSTRY.

Mutual Control in Sugar Making.

The *International Sugar Journal* for April 1906 gives an account written by Mr. J. Lely, of the Antigua central sugar factory, of a system in operation in Java, which is known as Mutual Control. The following is taken from that article:—

In Java, there is a system for the exchange of information concerning the working of the sugar factories there, which is known by the name of 'Mutual Control.' According to this system, each factory sends particulars to date as to working, comparison of the juice, etc., every fortnight; or, if this is not possible, every month, to the experiment stations, which superintend the system and distribute the results. In order that the different results may be comparable, particulars are given in the first list of the season as to the kind of installation and the modes of clarifying employed. With the same object, all the factories use the same system of chemical control, while their chemists employ, as far as possible, the same methods of analysing the juices, megass, etc., and give the weight of the cane and the measure of the juice without any unjustified correction. In this way, each factory can gain information as to what results are being obtained at the others, and the superiority or inferiority of any one factory is quickly shown.

It would be quite possible to adopt a similar system for the West Indies, from Jamaica to Demerara, for such factories as possess a complete system of control, that is, means of weighing the cane, measuring the juice, etc., and a competent chemist provided with a good laboratory. Barbados would be the best centre for the collection and distribution of results, the expenses of printing and posting of which could be covered by an annual fee of 8s. or 10s. from each factory, while no numbers of the report would be sold outside.

It should not be difficult to find some organization willing to undertake the work of receiving and collating the reports. This work might also be done in Demerara or in any of the islands.

The writer will be glad to receive any communication on the subject from any one interested in the proposals.

History of the Sugar Industry.

The *Sugar Planters' Journal* for March 31 last, contains under the above title a paper by Mr. W. H. Harmon, Secretary of the Western Sugar Refinery Company, read before the Cannery League of California, held in San Francisco on January 14, 1906.

The paper deals with the development of the cane and beet sugar industries of the world, from the middle ages to the present time. The following is extracted as likely to be of interest to the readers of the *Agricultural News*:—

We find references to the sugar-industry as early as the year 286, when sugar was used in the kingdom of Funen, south of the river Ganges, as a revenue producer. It is very likely that the sugar-cane originally came from India in the neighbourhood of the river Ganges, and later was carried by traders into other tropical countries.

In the year 998, a trust or monopoly was formed by the ruler of Egypt, covering the entire sugar production and consumption of that country. All factories were ordered to be closed except the factory run by him, and no sugar except that manufactured in his own factory was allowed to be sold. He erected special places of sale, and had officers appointed to watch the sales. All foreign sugar was confiscated. The first sugar which was known to have been sent to England was sent from Venice in 1319.

There are records from the year 1318 to the effect that taxes were paid to the King of Cyprus in the form of sugar.

Many efforts were made in the following years to create monopolies in the sugar business, but without success. In the year 1596 Sir Thomas Milway made application for sugar monopoly for England, but this was refused by Queen Elizabeth.

Bounties on the manufacture of sugar first came into existence about the year 1700 when Holland, to protect the industry, agreed to pay a bounty. France soon followed suit. About the same time, 1700, the price of a pound of refined sugar in London was 270s.

I would like to call your attention to the fact that when we refer to sugar statistics, we refer to the countries whose production enters into international commerce, or passes through the world's custom house. As an instance, about 2,000,000 acres in India are constantly producing sugar-cane, and this tremendous acreage probably produces about 1 ton of sugar per acre, the result being that the production in India has, for many years past, been about 2,000,000 tons, and yet this vast tonnage never enters into the world's statistics, owing to the fact that it is consumed entirely at home, and in a raw state. The methods of growing and processing the cane are most crude, as they are in a great many of the tropical countries. Since the war with Spain the United States has become possessed of a large sugar-producing area in Porto Rico, and also in the Philippine Islands. As an instance of the crude methods in vogue, I might say that, at the present time, there is not, as far as I know, one modern plant for the production of sugar in the Philippine Islands; and the area in square miles of the island of Luzon alone is about equal to the island of Cuba. The production of sugar in Cuba this year will amount to about 1,300,000 tons, while in the entire Philippine group the production will be somewhere in the neighbourhood of 200,000 tons.

The Mexican Sugar Industry.

The following extract has been taken from the *Louisiana Planter* for March 31 last:—

The Mexican sugar crop for the year 1905-6 is estimated by Willett and Grey at 105,000 tons, as against 115,000 tons the previous year. The *Mexican Investor* estimates the crop at about 137,000 tons. It will be recalled that the estimates of the sugar crop of Mexico for a number of years past have, in a general way, placed the crop at 100,000 tons of sugar coming from the newer sugar houses producing the better grades of sugar, and about 100,000 tons of low grade, or black sugars, sold and consumed in the localities where produced, and never getting into commercial channels.

The increased production of sugar in Mexico has necessitated the exportation of a considerable quantity, and the Mexican authorities report these exports for the year 1902-3 at 8,000 tons, for 1903-4 at 16,000 tons, and for 1904-5 at 38,000 tons. The crop now coming off in Mexico is said to be a good one, and it is thought that the exports will be as large as last year.



WEST INDIAN FRUIT.

BUDDED ORANGES.

The following, in regard to the treatment of budded oranges, appeared in the *Trinidad Bulletin of Miscellaneous Information* for April 1906:—

A few complaints have been received that orange trees sent out or sold by the Department as budded stock of the best Florida kinds, have proved, on growing, to be nothing more than the common sour orange. An instance of this was personally investigated, and it was found that the planter had allowed buds from the stock to grow up, which had taken away the strength of the budded portion, and, had they not been attended to, would have eventually destroyed it. It is, therefore, not the fault of the Botanical Department, but the misfortune of the planter in not being fully conversant with the treatment required. In future cases of the kind, the Department would be glad if planters would seek the advice of the Agricultural Instructors when in the district, or apply at the Experiment Station, St. Clair, when all necessary instruction will be given. In short—this is, *keep all growths cut away which arise below the point where the bud is inserted*. If allowed to remain, these growths will take all the strength away from the budded area, and the tree must develop into nothing more than the sour orange. All our buds are placed upon stocks and roots of the sour orange, because this stock withstands the rot caused by *Mal-de-gomme*, which kills so many of the sweet oranges raised from seed.

AWARDS FOR JAMAICA FRUIT.

Writing on the Colonial Fruit Show, the *West India Committee Circular* for April 4 states:—

The West Indian exhibits, though excellent in quality, were small in quantity, Jamaica being the only colony which sent any fruit direct. The fruit was set out on a show stand from last year's colonial exhibition, and came in for much attention from the judges, who made the following awards:—

THE JAMAICA AGENCY (ASTON W. GARDNER & CO.,) A SILVER KNIGHTIAN MEDAL FOR GRAPE FRUIT.

‘This fruit, uniformly graded and beautifully packed in cases of six, was practically without a blemish, and the judges were able to tell from its weight and appearance alone what excellent condition it was in.

(MR. G. L. LUCAS, OF CONSTANT SPRING, JAMAICA, A SILVER BANKSIAN MEDAL FOR PINE-APPLES.

‘The pine-apples were large in size and juicy. They compared most favourably with those from Natal, which

were of the smooth-leaved variety. It has been customary to export pines in tubs, and they have therefore reached the market in poor condition, and have sold badly. If, however, they could be sent over as these Jamaica pines were, in small crates holding a dozen, there should be a great future for them.

MR. E. W. MUIRHEAD, OF MANDEVILLE, JAMAICA, A KNIGHTIAN BRONZE MEDAL FOR ORANGES.

‘A marked improvement was noticeable in these oranges, which showed evidence of careful cultivation and selection. The colour was bright, and they were juicy and very sweet. Mr. Muirhead also sent grape fruit, but these were, unfortunately, not in so good condition. This fruit, to arrive in perfect order, should be packed in single layer packages, each fruit being carefully wrapped in paper and with woodwork between in each instance.

MR. E. F. COKE, OF MILE GULLY, JAMAICA, A KNIGHTIAN BRONZE MEDAL FOR LEMONS.

‘The lemons were very large and full of juice, and it was the opinion of the judges that if they had arrived in quantity last summer when there was a shortage of Neapolitan lemons, they would have easily retailed at from 3d. to 4d. each. If the Jamaica lemons were graded properly and packed in small cases of 200 large, 300 medium, and 400 small, they would be saleable, and if sent to arrive in July, August, September and October, they should pay commercially every year.

THE WEST INDIAN PRODUCE ASSOCIATION, LIMITED, OF 4, FENCHURCH BUILDINGS, LONDON, A SILVER GILT KNIGHTIAN MEDAL FOR WEST INDIAN PRODUCE.

‘The West Indian Produce Association made this show the occasion for their first appearance in public, and a length of table of some 30 feet was covered with a varied assortment of West Indian produce, including pure cane sugars, Blue Mountain coffee, pickles, honey, preserves, Jamaica and Trinidad cigars, and many minor delicacies. The sugar was shown in barrels cut in sections and glazed, which enabled visitors to see the crystals, while they could sample the sugar, which was also piled on the top. The association also showed papaws and pumpkins of Gargantuan dimensions.

‘The next exhibitions of colonial grown fruit are fixed for June 6 and 7, and December 4 and 5. There is no charge for space, and intending exhibitors are requested to communicate to the Secretary of the West India Committee, who will be pleased to arrange for the staging, and take charge of such exhibits as may be sent over.’

FRUITS AND VEGETABLES IN JAMAICA.

The *Bulletin of the Jamaica Department of Agriculture* for March 1906, contains an interesting article by Mr. William Harris, F.L.S., Superintendent of Hope Gardens, entitled 'Seasons and Prices for Fruits, Vegetables, and other Economic Products in Kingston, Jamaica.' The following is quoted from the introduction:—

As there is a good deal of misapprehension with regard to the seasons for the various crops grown in Jamaica, and the duration of the season for each crop, the compiler visited the principal market in Kingston once a week for twelve months for the purpose of noting the various products offered for sale, and the prices charged to consumers. These prices are at least one third, and frequently three or four times higher than the prices paid by the retail dealers to the growers of the commodities enumerated. The prices noted for economic products such as ginger, annatto, etc., were those paid by a large exporting firm to the producers.

It will be readily understood that the seasons vary somewhat according to prevailing conditions, and the prices also vary according to supply and demand.

Then follows, in a table, a list of fruits, vegetables, and economic products with the common name given in the first column, the technical name in the second, while the third or right hand column gives the seasons for the crops as well as the prices paid to the growers. Such a list should be of great assistance to both grower and buyer, indicating as it does the approximate prices for the year, and the seasons when each of the products mentioned may be expected to be available in greatest quantity.

EDUCATIONAL.

Lectures to Teachers in Antigua and Montserrat, 1905-6.

The following is from the report of Mr. A. H. Kirby, B.A., Science Master of the Grammar School, Antigua:—

'In dealing with the elementary science subjects prescribed in the Code of 1903 of the Leeward Islands Educational Department, the teachers in elementary schools have met with difficulties in that part of the syllabus which relates to the Middle Division, Part I. These difficulties have arisen from the fact that information of a concise nature, and suitable to the natural conditions under which the teachers found themselves, was not obtainable by them, as well as from the fact that they did not possess the special knowledge which would enable them to compile it themselves. It was, therefore, decided to supply the deficiency by means of a course of lectures which should not only give the information, but should also place those who, attended them in a position to add to it on their account.

ANTIGUA.

With these objects in view, a lecture was given in each of the months September to December of 1905, and in January and February of 1906, in the science class-room at the Grammar

School. These dealt with (a) the differences which plants exhibit as regards their outward appearance and habits, and the chief reasons for them; (b) a simple outline of the life-history of the less well known types of plants, including bacteria, yeasts, green algae, fungi, lichens, ferns, and mosses; (c) different forms of fruits; (d) plants and their habitat; (e) the teaching of facts relating to plant life from specimens raised in boxes and pots. Twenty-eight teachers and pupil teachers were notified as to the times and scope of the lectures of the intended course by means of a circular, through Mr. J. E. James, the Education Officer. The average attendance throughout was 18·5, a number which may be regarded as fairly satisfactory when the difficulty in getting to St. John's which is experienced by those teachers living at a distance, is considered.

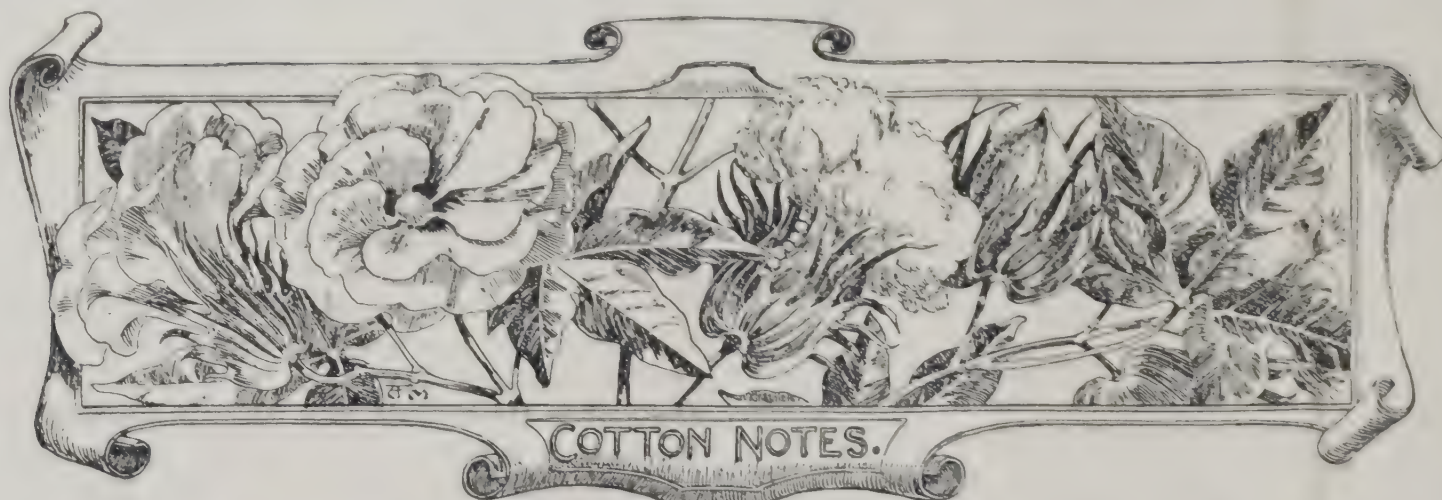
The lectures were illustrated by specimens, and by simple experiments where these were required. The taking of notes was encouraged and aided by the laying of special stress on the more important points, as well as by concise tabulation of the subject-matter on the blackboard after its general nature had been dealt with orally. The notes thus taken were subsequently corrected, and supplemented, if necessary, by the lecturer. In the treatment of the subjects, it was constantly kept in mind that the result of the course should not be merely the acquirement of a certain amount of useful knowledge by those who attended it, but that these should also be able on its termination to add to that knowledge themselves, and to impart it to others in a simple and systematic way. With these objects in view, the importance of making careful observations and recording them, whenever opportunity is afforded, was insisted upon, and hints were given as to the methods of teaching and demonstration which are specially applicable in the case of the subjects dealt with. By questions from the lecturer during the lecture, and from the teachers after its conclusion, its scope was usefully increased, and points upon which any doubt existed or may have arisen, were successfully elucidated. One illustration of the usefulness of such a procedure is afforded by the fact that part of the last lecture was devoted to the consideration of the cultivation of plants in boxes and pots, as a simple and easily controlled means of investigating their behaviour when placed under differing conditions, a subject which it was not intended to include in the course at first.

A short outline of the course has been prepared by the lecturer with the object of aiding teachers in the future. This is now in the hands of the Inspector of Schools.

MONTSERRAT.

An amplified course of eight lectures dealing with the same subjects was given in January of this year. It was considered advisable to increase its scope in this case because no lectures have recently been given to teachers in that island. In these, the same objects were kept in view as in Antigua. The standard of the notes and the attendance were good. Twenty-two head teachers and assistants, and twenty-nine pupil teachers and monitors attended, the average attendances being 18·1 and 24·3 respectively.

In both cases, the reasonable attitude taken up by the teachers with regard to the subjects under treatment and their right appreciation of what was told them about these was evidenced by the notes taken by them. In most cases, these notes were very good, and lead to the hope that the effect of the course may extend, not only to the special object in view, but through the whole of the work connected with the teaching of the general principles of agriculture.



UTILIZATION OF COTTON SEED.

It has been realized that to export cotton seed from the West Indies is to make the worst possible use of this commodity. All the cotton seed produced in these islands should be dealt with in one or other of the following ways:—

The seed may be crushed into a meal by a disintegrator, as is done at Barbados, St. Vincent, Antigua, and Nevis, and used for stock feeding, so that the resulting manure may be put back into the land; or, where an oil factory is in operation, as at Barbados, arrangements might be made to have the oil extracted from the seed, and the cake meal used for feeding.

The essential point is that the valuable fertilizing portions of the seed should go back to the land, in order to enable it to produce future crops.

As bearing on the questions whether it would be more advantageous to feed the stock with the crushed seed (with all the oil in it), or with the cake meal (after the oil is removed), the following extract from a letter recently received from the Acting-Director of Experiment Stations, U. S. Department of Agriculture, may be of interest:—

‘It is generally conceded that cotton seed is more valuable as a feeding stuff after the oil is expressed. This material is used chiefly as a source of protein (nitrogenous matter) and, of course, the proportion of this constituent is higher after the removal of the oil. Furthermore, the large amount of fat contained in the unextracted seed is not needed in a ration, as there is usually no lack of nitrogen-free constituents.’

COTTON SEED AND COTTON SEED CAKE.

Messrs. H. E. Thorne & Son, Ltd., of the Barbados Cotton Seed Oil Factory, have written a letter to the Imperial Commissioner of Agriculture with respect to the purchase of cotton seed, and the sale of cotton cake, from which the following is taken:—

We have to inform you that we have written to our various correspondents throughout the West Indian Islands, to inform them that, owing to the price of cotton seed oil having advanced, we are now paying \$24.00 per ton for cotton seed delivered here, and will sell the cake meal at \$21.00 per ton, f.o.b. Barbados.

We wish to impress on growers the fact that we are prepared to let them participate in the rise and fall of the market, in the same way as if they shipped their seed to England, where it would be sold according to the state of the market for oil and cake.

SEASONABLE NOTES.

Cotton growers are advised to commence the preparation of their land as early as possible, in anticipation of the next planting season. If these operations are postponed until too late, it will be impossible to do the work properly. In order to obtain good returns, both as regards quality and quantity, the planter must look upon cotton as one of the important crops on the estate, in all matters of care and attention—in the preparation of the land, the application of manures, tillage of the growing crop, harvesting and preparing for shipment—and he should thoroughly believe that cotton will repay in the returns any careful attention to these details.

Cotton should be given a moderate amount of manure. An excessive quantity does not give satisfactory results. It stimulates the plants to produce a maximum quantity of wood, but only a minimum of lint. The amount of manure which may be given to cotton is about half what is usually given to canes. No time should be lost in turning in pen manure and sheep manure, for, unless these have been in the ground a considerable time before the seed is planted, a large quantity of the food material will only become available after the crop has been reaped, and will thus be lost.

Planters are advised to be particular about the drainage of heavy land, and of fields in which there is any water standing. Too much moisture has a very injurious effect on the quality of the lint. Steep hillsides are not at all suitable for cotton, and if such are facing windward, only very poor results can be expected. Land newly cleared from bush ought to give very good results. It is advisable, however, that such land should be well tilled before planting the seed.

Wind-breaks will be found very useful on estates exposed to the prevailing winds. Rows of Guinea corn running across cotton fields at right angles to the direction of the prevailing winds furnish excellent protection to the cotton. These wind-breaks should be planted early, so as to afford protection to the cotton in its first stages.

EXPERIMENTS WITH COTTON IN THE TRANSVAAL.

The *Transvaal Agricultural Journal* for January 1906 contains interesting accounts of experiments with cotton in that colony. Mr. H. S. Alterroxe, manager of the Tzaneen Experimental Farm, summarizes the results of the trials so far made, as follows: ‘I believe that in the low country, on medium good soil, the following yields per acre, in ordinary seasons, can be reckoned on—‘Upland varieties, 500 lb.; Egyptian varieties, 450 lb.; Sea Island, finest long staple, 350 lb.’

‘I consider that the cultivation of cotton in the lower districts, with a dense native population, has a very good future, and that in many other parts it might be made a paying industry.’

SEA ISLAND COTTON MARKET.

The following report of Messrs. Wolstenholme & Holland on the condition of the Sea Island cotton market is dated April 4, 1906:—

We have to report a continuance of the good demand for Sea Island descriptions of cotton at firm prices, all offerings of desirable qualities being readily taken.

The sales include Barbados cotton from 15*d.* to 18½*d.*; St. Vincent, 17*d.* to 19*d.*; St. Kitt's, 14½*d.* to 17*d.*; Antigua, 15*d.* to 19*d.*; Nevis, 14½*d.*; and Montserrat, 14½*d.*

The buyers of qualities over 16*d.* per lb., having a limited consumption, have generally supplied their requirements, and we think there will not be much further demand for extra qualities.

Writing on the condition of the Sea Island cotton market for the week ending March 23 last, the *Cotton Trade Journal* says that it closed active and firm with the demand good from all sources.

'The week brought out comment from the country as to what effect the higher prices and better market will have on the coming Sea Island acreage. The opinion is freely expressed that it will cause a change in sentiment, and that a larger acreage will be put in by some planters than was contemplated by them recently. Preparations are in progress for the new crop, with ploughing going steadily on in all sections.'

SCIENCE NOTES.

Supply of Nitrogen to Plants.

Mr. J. Jamieson, Director of the Aberdeenshire Agricultural Research Association, has recently issued a report in which he claims to have discovered that all plants can feed upon the free nitrogen of the atmosphere by the agency of hair-like structures on the leaves.

The microscopic examination of the leaves of some plants showed that, amongst the ordinary hairs, club-shaped processes could be seen. These were empty at first, but after they had developed, they contained a little albumen near their tips. This gradually increased in amount, and extended down to the base of the process. 'On a few microchemical tests' Mr. Jamieson bases the arguments for his 'important discovery,' and concludes that these hairs manufacture the albumen from the nitrogen of the air, and then pass it along as food to the plant.

No experiments appear to have been conducted to show by analysis that plants have 'fixed' any nitrogen during their growth, and the large mass of work dealing with this subject that has been done during the past sixty years at Rothamsted and elsewhere is entirely dismissed. As early as 1840, Liebig in his report on 'Organic Chemistry in its Application to Agriculture and Physiology' drew up a scheme by which he suggested that plants obtained their nitrogen as well as their carbon from the atmosphere. Experimental evidence showed, however, that a normal vegetation, with few exceptions, could not supply itself with the necessary nitrogen from atmospheric sources.

Leguminous plants have since been shown to be able to fix nitrogen by the agency of bacteria in certain nodules

on the roots. Mr. Jamieson denies the presence of any such bacteria, and therefore dismisses any possibility of improving land by means of leguminous crops.

It is to be regretted that such an 'important discovery,' which has resulted from misinterpretation of certain facts familiar to any botanist, should be quoted without comment. Moreover Mr. Jamieson is giving advice to practical farmers in Aberdeenshire to alter the systems of their cropping and manuring, systems which have been devised after years of experimental work.

The Industrial Production of Nitrogen from the Air.

The *Louisiana Planter* for February 24, 1906, contains an interesting article by Mr. C. A. Zimmerman on the artificial production of nitrogen compounds for use as manures by agriculturists. From this article the following extracts have been taken:—

Nitrogen is indispensable for plants because it seems to build up the so-called plant albuminoids. With the present intensive cultivation of the soil, it has become necessary, with many crops, to support the soil by the addition of nitrates or salts of ammonia. There has always been a danger of the supply of these nitrogenous fertilizers not being able to meet the demand, and this has clearly been demonstrated during the last few years by the rise in price per unit nitrogen. It is also possible that the deposits of nitrate of soda in Chili will sooner or later become exhausted, and then an important source of nitrogenous manures will be cut off. It has, however, been shown, that the atmospheric nitrogen can be transferred into nitric acid by electricity and thence made into basic nitrates. Repeated efforts to manufacture these nitrates on a commercial scale have been tried in America, but the cost of production has always been too high. Now, however, a considerable amount of nitrate of calcium is produced in Norway, whose nitrogen is gained from the atmosphere by means of electricity and making use of the mighty water powers of that country. Several factories are in operation, and other plants are in construction in Dalmatia, in the Austrian Alps. The details of the production and the methods practised in the different factories are strongly guarded secrets.

The agricultural importance of the artificial productions of nitrogen compounds, such as this basic calcium nitrate, cannot be too greatly appreciated, and it would be gratifying to know that other countries intend to extend, still further, this industrial production from atmospheric air.

FACTS ABOUT TURKEYS.

The following brief notes on turkeys, which may be of interest to readers of the *Agricultural News*, are taken from the *Farm Journal* for February 1906:—

Medium-sized turkeys are the best for breeding. The eggs are usually fertile and hatch well, and a flock of six should raise from 75 to 100 young a year. Turkeys will thrive on any ground upon which people can live.

It is a mistake to sell the older birds and retain the younger ones for breeding; for the turkey is not fully mature until two years, is at its best at three years, nearly as good at four, and is profitable as a breeder up to its fifth year.

Wholesome food, freedom from lice, and dry, healthy quarters are the secrets of success.

EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming, should be addressed to the Commissioner, Imperial Department of Agriculture, Barbados.

All applications for copies of the 'Agricultural News' should be addressed to the Agents, and not to the Department.

Local Agents: Messrs. Bowen & Sons, Bridgetown, Barbados. *London Agents:* Messrs. Dulau & Co., 37, Soho Square, W., and The West India Committee, 15, Seething Lane, E.C. A complete list of Agents will be found on page 3 of the cover.

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Agricultural News

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NOTES AND COMMENTS.

Contents of Present Issue.

The editorial in the present number discusses the question of insurance against loss from the effects of hurricanes. There can be no doubt that it would be of great benefit to owners of properties, cultivations, and crops in the West Indies to have such a class of insurance in operation. Although some objections to the present scheme have been brought forward, the whole matter is still under consideration and will, it is hoped, be so modified as to be thoroughly acceptable both to the underwriters and the assured.

The notes on the sugar industry on p. 131 include an extract on the history of the sugar industry; an estimate on the Mexican crop for the present, and a brief article on 'Mutual Control' in sugar making. This outlines a control system which works well in Java, and might prove very useful in the West Indies.

The insect notes in this issue comprise a number of short accounts of insects. The most unusual occurrence is recorded on p. 138 in the case of white ants attacking sugar-canes.

On p. 139 will be found a narrative of how a correspondent got rid of mosquitos about his residence. The method adopted and the uniformly satisfactory results obtained, are related in an interesting manner.

A report on a sample of tobacco from British Honduras appears on p. 141. The tobacco was grown by the Indians, and cured at the Botanic Station. On the same page is a brief report on a sample of cacao from Tortola.

Cassava Cuttings.

The Curator of the Botanic Station, Montserrat, in a letter to the Imperial Commissioner of Agriculture, states that there are a fair number of cuttings of the Columbian varieties of cassava available for distribution, which he would be glad to forward to other islands, on receipt of requests from the Botanic Stations. The varieties are: Negrita, Nos. 11, 12, 15, and 17; Helada, No. 5; Paloma; Pacho, Nos. 17, and 13; and Blancita.

Orders for any of these cuttings should be forwarded through the officers of the Imperial Department of Agriculture in the several islands.

British Honduras.

We regret to learn that since the removal from British Honduras, of the Hon. Philip Cork, C.M.G., the Agricultural and Commercial Society started by him is in a moribund condition, owing to the fact that no practical interest is being taken in agricultural matters in and around Belize.

At a recent meeting, the Secretary reported that during 1905 no meeting had been held since January 13 of that year, and the issue of the journal had been stopped.

The true agricultural life of the colony is to be found outside of Belize, and especially on the rich lands bordering the southern rivers. Thriving industries are possible there in connexion with the cultivation of cacao, cocoa-nuts, bananas, and rubber. We must evidently look in that direction for whatever development is to take place in agricultural matters in British Honduras.

A good class of cotton might be produced in the northern districts, provided one or two energetic people would make a beginning on right lines.

A Blazing Beach.

An interesting article appeared in *Science N.S.*, Vol. XXII., No. 572, for December 15, 1905, in which Dr. D. P. Penhallow, of McGill University, Montreal, explains the wonderful phenomenon of a sea-beach on fire. Between 7 and 8 o'clock on the evening of September 1, 1905, flames appeared rising from the beach at Kittery Point, Maine. The flames were about 1 foot in height, and were accompanied by a loud, crackling noise that could be distinctly heard 100 yards away. At the same time, very strong sulphurous acid fumes were liberated. The sand of the beach at this point was too hot to be held in the hand, and when it was stirred in water, bubbles of gas were liberated, which broke into flame as they came into contact with the air at the surface of the water.

This extraordinary occurrence is explained as being a spontaneous combustion of marsh gas, generated by decomposing vegetable matter a short distance beneath the surface of the sand. It is directly comparable with the 'will-o-the-wisp,' the 'corpse candle,' etc., so common to English folk-lore. The following sentence is quoted from the conclusion of the article: 'It would seem that the possibility of such combustion on a large scale offers a most reasonable explanation of many forest fires, the origin of which it has hitherto been impossible to account for in a satisfactory manner.'

The Cotton Industry.

The *Journal of the Society of Arts* for March 23, 1906, in reviewing the cotton industry in England, mentions the remarkable increase in spinning and other cotton factories. 'During the first ten weeks of the present year six new concerns were registered with a capital of nearly half a million, representing 500,000 spindles, and this activity may be expected to continue whilst trade remains anything like as good as it is at present.'

The increase in exports is enormous, amounting in 1906 to 20 per cent. in excess of the total for 1905.

Cotton planters cannot fail to recognize these facts as encouraging, for increased exports, and the manufacture of cotton goods must create a demand for raw cotton, and an active demand always means quick sales and good prices.

Rubber Consumption and Natural Rubber.

The *Journal of the Society of Arts* for March 23, 1906, discussing the rubber trade and rubber supplies points out that the question has arisen as to whether the supply of rubber is likely to exceed the demand, and the opinion is expressed that the indications are that the demand is likely to be greater than the supply for some time to come, although the sources of natural rubber supply will eventually be exhausted.

After comparing the world's consumption of 60,000 tons in 1903 with the 65,000 tons in 1905, the *Journal* states that the production of rubber in British Colonies has fallen off: 'In 1896 it was 111,225 cwt.; in 1904 it had fallen to 40,673 cwt., this decrease being due, no doubt, to the reckless way in which the wild rubber trees have been treated, as, for example, in Lagos, where in three or four years the rubber industry was practically destroyed by reckless tapping. There is no reason to suppose that in other parts of the world, outside the British dominions, where there is, and can be, no sufficient supervision, there has not been similar waste of the natural product. If this be so, it is not unreasonable to assume that the natural sources of rubber supply are being seriously affected, and must before very long disappear. The natural rubber trees and plants are scattered over such an enormous area that it is impossible to insure proper treatment of them, and in the absence of such treatment, they cannot survive. It is said that there are vast untapped supplies of wild rubber in South America. It may be so, but it is certain that the supply from African sources is steadily decreasing, and whilst until now the imports of rubber from other centres, notably Brazil, Uruguay, and Peru, have more than compensated for the failure of the African exports, and collections from new ground may for a time more than make up for exhaustion elsewhere, year by year this new ground will be more difficult to find, and the conclusion seems unavoidable that before many years have passed the supply of natural rubber will diminish, without the hope of recovery.'

Some Bermuda Plants.

In a pamphlet entitled *A List of Plants collected in Bermuda in 1905*, Mr. Albert Hanford Moore gives an account of a considerable number of plants which he collected in Bermuda in July and August 1905. In the introductory note, Mr. Moore mentions that 'the peculiar interest presented by the flora of the islands composing this colony lies in the fact that there is but a comparatively limited number of endemic species, and that the flora is consequently made up almost entirely of plants derived from elsewhere, either by the agency of man or without it; mainly from the West Indies, but also from North and South America, and even from Asia and Africa.'

The list deals with some 221 species, two of which are described as new, and several which were not previously recorded from Bermuda.

The two new species are *Rhynchospora dommucensis*, a sedge of the family *Cyperaceae*, and *Elaeodendron Laneanum* of the family *Celastraceae*.

The determinations of the plants given in this list have, for the most part, been made by comparison with specimens in the Gray Herbarium of Harvard University, Cambridge, Massachusetts.

Plantation Rubber.

In continuation of its discussion of rubber and rubber supplies the *Journal of the Society of Arts* goes on to say that it has been stated that to yield permanently a ton of rubber per year requires not less than 10 acres of plantation.

That is a rather wide generalization. Soil and climate have much to do with the yield of rubber as with other products, and they vary widely. But even assuming that a rubber plantation of 1,000 acres can only be safely relied upon for 100 tons of rubber, 650,000 acres would meet the whole of the present demand for rubber. Of course that would represent a very big area of plantation, and for many years to come natural rubber must form a large portion of the world's supply; but rubber planting is now being carried on on a very extensive scale, and ten years hence, when the natural supply may be visibly shrinking, the plantation supply will have very largely increased. It has to be remembered, too, that the loss from natural rubber is from 10 to 15 per cent. in manufacture; whereas that from the 'biscuit' rubber, prepared from cultivated rubber, is generally less than 1 per cent. 'It would seem probable that for some years to come there will be no visible diminution of the supply of natural rubber; there may even be some increase from the opening up of new areas, and the increase in the receipts of plantation rubber will anyway, after the next year or two, meet, or nearly meet, the increased market demand, whilst ultimately it will bring prices down. For the cultivation of rubber is not like that of cotton, attended with many difficulties; it is an easy and cheap cultivation, and the area of the earth's surface upon which it thrives is practically boundless. Nor must it be forgotten that there is always the possibility, some say the likelihood, of an efficient substitute for rubber being discovered.'



INSECT NOTES.

White Ants attacking Sugar-canes.

The Agricultural Superintendent, St. Kitt's, has forwarded to the Imperial Commissioner specimens of sugar-cane attacked by white ants, or Termites, with the information that a whole field is seriously attacked.

The termites attacked the canes at the base of the stalk, and had so thoroughly tunnelled out the inside as to destroy them. Both old and young canes were attacked. No large nests were to be seen, but the small white insects were in every stool of canes. In the specimens forwarded by Mr. Shepherd, there were only the workers, no queens or soldiers, and the conclusion is that these are merely individuals scattered from some enormous nest that has been broken up in the vicinity, or that there are underground nests in or near the field from which the insects travel forth.

It is proposed to plant with cotton, the fields in which the sugar-cane is attacked, and it is believed that thorough tillage and a change of crop will effectually check this pest. The field will be burnt over, and the subsequent breaking up of the old stumps and forking or ploughing the soil will expose the insects to the sun and birds.

The Agricultural Superintendent has recommended, also, that these fields should be planted in cotton as this crop would be less likely to be attacked by the termites remaining in the soil than the canes.

Moth attacked by a Fungus.

A short time ago the Imperial Commissioner of Agriculture received from Mr. R. J. Graves, of Belle Vue estate, St. Andrew, Grenada, a large Sphingid moth on which

appearance. The accompanying illustration is from a photograph, and shows the features already mentioned.

This specimen was forwarded for identification to the Director of the Royal Botanic Gardens, Kew, who writes that the fungus is *Isaria Sphingum*, Schweinitz. The moth has been identified at the British Museum (Natural History) as a 'sphinx moth of the genus *Anceryx*, probably *Anceryx fasciata*, a common West Indian and South American species.'

The Cacao Beetle in Grenada.

The following extract from a letter from the Agricultural Superintendent at Grenada to the Imperial Commissioner of Agriculture gives an account of a practical method of dealing with the cacao beetle in that island:—

The chief trouble in this district is the cacao beetle (*Steirastoma depressum*). Many pounds are spent each year in fighting this pest. Gangs of boys are employed to collect the beetles, for which they are paid so much per dozen. Mr. Gall, the manager, has also adopted a plan which works very well, and of which I have seen no account published, though it may be familiar to you. When pruning, the branches, etc., cut off are left on the ground as a bait, while all wounds on the trees are carefully tarred. After about a week, when these branches have wilted, the beetles visit them freely, and deposit their eggs, and then some three weeks later, when full of grubs, the branches are carefully collected and burned, or buried. The former treatment is preferable, for if the soil is stony, and the prunings cannot be buried deeply, the beetles work their way out. In such situations, where burying is adopted, I advised the covering of the prunings with lime to aid in killing the grubs.

In a recent number of the *West Indian Bulletin* (Vol. VI, p. 94) an account is given of the method practised in Surinam, consisting of tying pieces of the bark of the silk cotton tree round the cacao trunks to furnish hiding places for the beetles, from which they are collected. Possibly a combination of this with the method described by Mr. Anstead would result in increased effectiveness.

Cotton Insects in the Transvaal.

In the *Transvaal Agricultural Journal* for January 1906, it is stated that the cotton boll weevil is not present in South Africa, and it is hoped, by carrying out preventive measures such as fumigation with carbon bisulphide, and treating with formalin, not only to keep out this and other insect pests, but also to prevent the introduction of many fungous diseases of cotton. The cotton boll worm is already present in the Transvaal, and has done considerable damage to the experimental plots in different parts of the colony.

It is interesting to note that the Transvaal has adopted the fumigation of imported cotton seed with carbon bisulphide as recommended by the Imperial Department of Agriculture (*Agricultural News*, Vol. IV, p. 102), and that

in that colony disinfection with formalin is practised in the same way that the disinfection with corrosive sublimate is in the West Indies, to prevent the introduction of fungoid diseases of the cotton plant.



FIG. 3. FUNGUS GROWING ON A MOTH.

a yellowish fungus was growing. The moth was attached to a leaf by masses of the fungus, and from the body and wings of the insect other of these masses grew upward and outward in the form of long spines, giving the whole a remarkable

HOW TO GET RID OF MOSQUITOS.

A PERSONAL NARRATIVE.

In some parts of the West Indies mosquitos cause a good deal of annoyance, and in not a few cases they affect the general health and welfare of the community. Anything that can be done to lessen their number and the virulence of their attacks is, therefore, worthy of attention. In the following popular notes, a correspondent has been good enough to place on record his own experience in that direction, in the hope that others may follow his example.

The essential point is that the steps proposed to be taken are those that are exactly suited to the circumstances in each case. As these vary, so must the plan of operation. Possibly others may be led to give their experience in dealing with mosquitos, and so place the results on record. In the meantime, our correspondent's contribution is as follows:—

As an ounce of fact is worth a bushel of theory, it might be interesting to readers of the *Agricultural News* to have placed before them a brief story of my experience in getting rid of mosquitos. Not only has this been accomplished, but I believe I have also greatly improved the health and comfort of my household.

I am a believer in the theory that mosquitos are capable of conveying infection, and the fewer there are about the better. Another, and an important point that I might mention is, that I have carried out my experiments at a nominal cost.

In the hope that my example might be followed by other readers of the *Agricultural News*, I will briefly state the manner in which I carried out my experiments.

The first step was carefully to examine the immediate surroundings of my house in order to satisfy myself that there were no pools left about, in which the mosquitos could breed. I found several depressions where water lodged, especially where the bath water was emptied; also near the kitchen sinks and in the neighbourhood of the stables. All these were immediately filled. Next, I examined the gutters of the roofs of the house and out-buildings. I discovered quite a number of unexpected depressions in these. The sparrows evidently knew them better than I did, for they had found them very convenient bathing places. In order to put the gutters in good condition the services of a plumber were requisitioned, and in due time he made good all 'sagging,' where rain water had hitherto lodged and where, no doubt, mosquitos had been breeding freely, some of them immediately under the windows of the bedrooms.

In order, however, to compensate the sparrows and other birds for the loss of their bathing places, and to attract the feathered tribe generally to my garden, I placed a large earthenware bowl filled with water in one corner of the lawn, where the birds could have their bath at leisure. I placed a large stone in the middle of the bowl so as to allow the birds to alight upon it and feel secure. I may add that the water in the bowl was regularly emptied every evening, so that no mosquitos could breed in it.

In the stable yard and other localities where tanks were in use for watering the horses, cows, and poultry, arrangements were made to have these emptied every night, and filled with fresh water the first thing every morning. In the grounds at some distance from the house, after some search,

I found a pool under a rock where storm water collected after heavy rains. In another locality, I found a disused tank with a little water still lying at the bottom of it; while in a field not far away was an old well about 25 feet deep with a good supply of water which, however, was useless as there were no means of pumping it. All these I have regularly treated by throwing into them once a month, $\frac{1}{2}$ pint of kerosene oil. The oil immediately spreads over the surface, and forms a film that effectually destroys all insect life. I may mention here that, as the refined oil ordinarily used for lighting purposes is very volatile, it is necessary to repeat the applications of it to stagnant water at regular intervals. A crude oil would last much longer.

In my efforts, as above described, I acted on the supposition that as mosquitos cannot breed without stagnant water, nor in water covered with a film of kerosene oil, sooner or later, they must disappear if this treatment were consistently carried out; while my experience taught me that the few that were likely to be carried by the wind from elsewhere would give little or no trouble.

As a good supply of water for domestic use is supplied from covered reservoirs, there were no rain water tanks or cisterns to be dealt with. If these had been present, I would have made the covers to them so secure as to prevent mosquitos getting through, or as a last resort, used wire gauze. The latter is excellent for protecting bedrooms and nurseries when other means fail or are not applicable. In exceptional cases the use of slightly diluted citronella oil is recommended for protecting young children from mosquito bites. A mother who has tried this speaks highly of its efficacy. A few drops placed on the pillow, and slightly rubbed over the arms and hands and face, will be sufficient to keep off mosquitos during the night.

Briefly summing up my experience, I may mention that, at present, there are no mosquitos about my residence where formerly they were fairly abundant. Further, there are no feverish symptoms amongst any members of my family, and we are seldom or never troubled by the 'piping' of any culex.

I would advise all who are troubled by mosquitos in and about dwelling houses to give a practical trial of these methods for getting rid of the annoyance. If they do this, I believe that they will learn a good deal, as I have, by careful experiment, and, at the same time, will add greatly to their own comfort as well as the comfort and improved health of those around them.

NORWAY.

The new Kingdom of Norway is evidently well worthy of imitation in regard to agricultural matters. The United States Consul writes as follows in the *Monthly Circular and Trade Reports* for December last:—

Agriculture.—Farming is popular. The people love their sterile soil. They watch it, work on it, nurse it into fertility, spreading on it first sea-weed and fish fertilizers. The raising of cattle, the production of butter, cheese, condensed milk, and the raising of poultry are conducted on artistic and scientific principles. In 1904, the Kingdom sent out 1,527,000 kilograms of butter and 770,000 kilograms of margarin. There is no law against the manufacture of margarin, but there is a strict law, backed by a public sentiment, against labelling it butter. Herein the Norwegians excel. It is to their industrial and commercial honesty that they owe a very great deal of the progress and prosperity that have marked recent years.



GLEANINGS.

'Yesterday,' says the *Port-of-Spain Gazette* for April 7, 'for the third year in succession the prize for the best school exhibit of horticultural specimens generally was awarded to Mr. Baird of the Carenage School.'

The *Louisiana Planter* has elicited the information that 300,000,000 lb. of peanuts are grown annually in the United States, 35,000 acres of land being devoted to the crop, and 170,000 persons employed in producing it. (*West India Committee Circular*, April 4, 1906.)

The *India Rubber World*, in its issue of March 1, 1906, states, with regard to the rubber industry: 'The least of all things to be feared is the possibility of over-production of rubber—at least during the life time of those who are now actively interested in this field.'

The following is an extract from a letter dated April 4, 1906, from the Secretary of the West India Committee to the Imperial Commissioner of Agriculture: 'I have this morning received the awards for the Liverpool exhibition, and am pleased to say that Grenada has received a gold medal for the comprehensive agricultural exhibits, and Mr. J. Cox Fillan, one for limes.'

Some fine specimens of seedling cane B. 208 have been recently received by the Imperial Department of Agriculture from the Cul-de-Sac estate, St. Lucia, forwarded by the Hon. E. G. Bennett. The largest cane measured 11 feet 5 inches in length and weighed a little over 11 lb. All the canes were clean and healthy, indicating that the conditions under which they had grown were entirely favourable.

A Royal Decree has been published in Portugal, the object of which is to promote the cultivation of cotton in Portuguese colonial possessions. Concessions of land on certain conditions will be granted, and cotton will be exempted from export duty in the Portuguese Colonies, and import duty in Portugal. The Government also is authorized to establish experimental stations for cotton cultivation. (*West India Committee Circular*, April 4, 1906.)

In the *Agricultural Journal of the Cape of Good Hope* for March 1906, a correspondent suggests that bats, instead of being exterminated, should be encouraged as much as possible. They are one of the agriculturists' warmest friends; for, given a liberal supply of bats, the various insect pests that attack growing crops and fruits, etc., will be found to give little trouble. Birds are both friends and foes to the agriculturist, bats are always friends.

The following is taken from a recent letter to the Imperial Commissioner of Agriculture from the Government Botanist, British Guiana: 'In reply to your enquiry as to the results obtained with Egyptian and Sea Island cotton in British Guiana, I regret to state that, on the whole, the growth of Egyptian cotton here is only a little more satisfactory than that of Sea Island; but that on soils where both do fairly well the Sea Island usually does the better.'

Mr. J. Russell Murray's monthly report for March has the following in regard to permanent exhibits: 'The permanent exhibit of the Agricultural Society, Trinidad, was completed and placed in the hall of the Board of Trade, Montreal, in a very handsome oak and plate glass cabinet. These exhibits of Trinidad products are confined to non-perishable produce—asphalts, manjak, sugars, cacao, copra, bitters, etc.—and have attracted very considerable attention.'

The *Cotton Trade Journal* for March 24 last says, 'With the somewhat better prices for Sea Island cotton the fear is expressed that the resolutions to decrease the acreage may at the last be modified. It is a settled fact, proved by the experience of the past, that good prices for cotton stimulates an increase in acreage more than any other influence. For this reason those most interested in the Sea Island cotton acreage for the new crop are anxiously anticipating the extent of planting.'

There is a big demand for yams just now for export to Colon. As there will be a larger number of West Indian labourers engaged there for the next five to ten years than at present, there will be a greater demand during the following years. Therefore, people favourably situated, should plant as largely of white yam as possible. Yellow yams and negro yams do not keep well, and though they may be prepared so that they may last a month, they are not favoured by exporters of yams. (*Journal of the Jamaica Agricultural Society*, March 1906.)

A very useful and ornamental plant which should be grown more is the sunflower. It serves a quadruple purpose. It bears a magnificent ornamental blossom, which bees go to for nectar and pollen; the seeds are excellent for feeding caged birds, and are good for fattening fowls for table; and the fourth purpose is that it serves as a trap (as was discovered by the late Dr. Neish) for fiddler beetles. Sunflowers seem to have a special attraction for these beetles, and they can be picked from them easily in clusters, and killed. Wherever there are orange trees, therefore, sunflowers can be set through them or near them to attract the fiddler beetles. (*Journal of the Jamaica Agricultural Society*, March 1906.)

It is gratifying to learn that the rare and handsome indigenous St. Vincent parrot (*Amazona Guildingi*) is still existing. This parrot is peculiar to St. Vincent, and is wholly different from all others occurring in the West Indies; hence its extermination (as stated in the *West Indian Bulletin*, Vol. V, p. 81) 'would mean not only the loss of a valuable game bird to St. Vincent, but it would deprive the West Indies of one of their greatest curiosities, and America of one of its finest birds.' It is hoped that in the St. Vincent Ordinance for the protection of certain birds and fishes (No. 11 of 1901), this parrot will soon be placed in the First Schedule, and so be protected all the year round, instead of as, at present, for the period from March 1 to July 31 of each year.



SEEDLING CANES AND MANURIAL EXPERIMENTS AT BARBADOS, 1903-5. Price 6d.

This, the fortieth number of the pamphlet series issued by the Imperial Department of Agriculture for the West Indies, contains a summary of part of the experiment work with sugar-canes which has been carried on during the past season at Barbados.

The varieties of cane reported upon in this pamphlet were grown upon fifteen estates situated in typical localities in the island, twelve of the plots being on black soils, and three on red soils. Owing to a long and severe drought, the canes suffered to a considerable extent from the root disease, many of the experimental plots being attacked. Cane B. 208 is stated to have given good results again, especially when grown on red soils. It is consequently recommended for cultivation in all districts of this type of soil.

Of those tested in the black soils, B. 147 came first, while B. 1,529 gave good results on both black and red soils. This has led to the increased cultivation of the latter cane on as many experimental plots as possible, and planters are recommended to give it a trial.

The manurial experiments were carried out at Dodds Botanical Station, and on four estates situated in typical parts of the island. The results confirm those obtained in previous years, and indicate that the application of nitrogen both to plant canes and ratoons is followed by a profitable increase in the yield. The application of sulphate of potash was found to be profitable as a general rule, but phosphatic fertilizers either had no effect upon the yield, or caused a diminution.

It has been found possible to produce seedling canes by cross-fertilization. At present, there are five plants growing—the first seedlings raised in the West Indies—whose parentage on both sides is a matter of certainty.

BULLETIN OF THE AGRICULTURAL DEPARTMENT, BAHAMAS. Vol. I, no. 3, March 1906. Price 3d.

This publication, which is edited by Mr. W. Munro Cunningham, the Curator, contains the report of the Board of Agriculture from May 1904 to January 1906, the report on the Agricultural Station; and the Curator's report on his tour of the out-islands.

In the first report, mention is made of the appointment by the Board of the present Curator; of his selection of a suitable piece of land for the Botanic and Experimental Station; of all that was done to encourage the industries of cotton, sisal, and onions; and the steps taken to search for new markets in England and Canada.

It is stated that a bill to promote the agricultural development of the colony will soon be presented to the Legislature, and that the Board is also recommending legislation for the inspection of citrus fruit on the lines of an enactment in force in Canada.

The report on the Agricultural Station shows that satisfactory experiments have been carried out in the growing of cotton, cassava, tobacco, pine-apples, onions, and vanilla.

With regard to the third division of this interesting publication—the Curator's report on his tour of the out-island—it is stated that the land is very fertile, and suited to growing all kinds of crops. Cotton, tobacco, rubber, cacao, pine-apples, and cassava are recommended for cultivation. For the development and future prospects of the pine-apple industry, however, more canneries are needed.

The Curator is of opinion that while the prospects for agriculture in these islands are decidedly encouraging, progress will be slow, since it is difficult to induce the native cultivator to abandon the primitive, and to adopt the new and better methods of cultivation.

TOBACCO GROWING IN BRITISH HONDURAS.

The *Government Gazette* of British Honduras for March 17, 1906, contained a report by Professor Wyndham R. Dunstan, M.A., F.R.S., of the Imperial Institute, South Kensington, on a sample of tobacco from British Honduras.

This tobacco is shown by the report to have a fair aroma and good burning qualities. The leaves were fairly uniform in colour, but were too thick for good wrappers. The chemical composition was fair, but it was stated to be more acid, and to contain more nicotine than the light tobacco in general use in England. These two defects are stated as being due, probably, to insufficient fermentation.

A portion of the sample was submitted to a firm of manufacturing tobaccoists who reported on its commercial valuation. They found that the tobacco appeared to be ripe and well fermented, and possessed of entirely satisfactory burning qualities.

The leaves were found to be too thick, and the texture too heavy for cigar wrappers; and, as regards flavour, the tobacco was too pungent to be used alone as fillers. Mixed in the proportion of about 30 per cent. of the sample with other cigar fillers however, it blended satisfactorily.

With reference to colour, efforts should be made to produce a tobacco much lighter than the sample submitted.

The following general conclusions and recommendations are quoted from the report:—

'These results show that there is reason to suppose that tobacco suitable for the European market can be produced in British Honduras, since the present material prepared by natives, and without any special attention being paid to European requirements, is valued here at 4d. per lb., a price similar to that obtained for much of the American manufacturing tobaccos now exported to European countries.'

The Curator of the Botanic Station writes that this tobacco was grown by Indians, who merely clear the land of bush, burn it over, and then put in the seedlings with a pointed stick.

Cacao from Tortola. A small sample of cacao was recently received from the Curator of the Experiment Station, Tortola, Virgin Islands, who stated that it had been grown by a peasant proprietor in that island, and had been fermented and cured at the station.

The sample was forwarded to Messrs. Wilson, Smithett & Co., 39, Mincing Lane, London, who state in their letter of March 29, that they think this cacao would find a ready sale. The report follows:—

'Brownish-red, part dark-stained, washed, thin skin, even, dark-brown break, a few slaty-coloured, a few unsound.'



ANTHRAX.

As is well known, anthrax is a very fatal disease. It is a specific disease caused by a bacillus. In the body of an infected animal, the bacilli grow and increase in numbers so rapidly that the poisonous products quickly produce death. It might be expected, therefore, that any animal that has died of anthrax will show large numbers of these bacilli in its blood. In the majority of cases this is so, but the following extracts from the *Journal of the Royal Agricultural Society, England, 1903*, show to the contrary in every case:—

The practice of deliberately feeding pigs with the flesh of other farm animals unexpectedly found dead, or at least of allowing the pigs access to the carcasses of such animals, is one of the ways in which cases of anthrax are multiplied. Out of a considerable number of cases of this kind that came under notice during the past two years, the following, which is the most recent, may be selected to serve as a warning. Portions of tissues from the head and throat of a pig were sent to the Research Laboratory at the Royal Veterinary College, with the request that they might be examined in order to determine whether the case had been one of anthrax or not. The history given of the case was as follows:—

The farmer who owned the pig had eight days previously found one of his cattle dead, and he had the carcass skinned and opened in the fold-yard, leaving the internal organs there for the pigs to eat. This occurred on Friday, and on the following Sunday a pig was found dead. It was examined by a veterinary surgeon, who attributed the death to cotton cake. On Tuesday another pig died, and the case was reported to the police. A second veterinary surgeon examined this carcass, and reported that it was 'a suspicious case of anthrax.' The remaining pigs, although more or less ill, were killed and dressed, and a third veterinary surgeon who inspected them expressed the opinion that the disease was not anthrax. A fourth veterinary surgeon was then called in, and, not being able to detect any anthrax bacilli in the blood of the animals, he sent portions of one of the worst affected for examination, as mentioned above.

Now, in the circumstances set forth in the above history, there was no justification for any hesitation in diagnosing the disease as anthrax, especially when it is further stated that swelling in the region of the throat was a symptom exhibited by some of the pigs. In the first place, it was the legal duty of the farmer to suspect that the ox which was unexpectedly found dead had died from anthrax; and when the pigs fed with the flesh or organs of that animal suddenly became ill, with swollen throats, there was no room for doubt on the part of the veterinary surgeons that the disease was anthrax. The fact that anthrax bacilli could not be recognized in the blood of the pigs in no way proved the contrary, for, as has been pointed out in previous Annual Reports, pigs may die from anthrax before the bacilli have become numerous in the blood. In such a case, however, the bacilli can always be detected in the tissues and glands of the throat, and they were recognized there in the parts of the pig sent by the veterinary surgeon who had failed to find any in the blood.

The loss of the cattle beast in the above outbreak was an accident, for which the farmer may not have been in any

degree responsible. The loss of the pigs was not an accident, but the penalty for an act of culpable ignorance or gross carelessness. The part played by the veterinary surgeons who failed to recognize the nature of the disease deserves still stronger reprobation, for had the pigs' carcasses been sold, the error in diagnosis might have entailed the sacrifice of human life.

This case should act as a warning, and therefore, any animal on an estate that dies suddenly of suspected anthrax should immediately be buried deeply with quick-lime. On no account should such a carcass be opened. Unless these precautionary measures are taken, the disease may spread rapidly and occasion severe losses.

TREATMENT OF ANTHRAX.

(Concluded from p. 125.)

A bacteriolytic serum prepared by injecting protected animals with large quantities of virulent cultures has been used with great success as a curative agent for local anthrax (malignant pustule). This has led of late to a few experimental trials with serum on animals. The history and pathology of anthrax in the latter, however, lead one to believe from the first that a serum can have a very limited application either as a curative or preventive agent. As a preventive, its action like that of other sera can only be very temporary, whereas the spores of anthrax on infected pastures persist indefinitely. It begins, however, to act almost immediately after injection, and might be usefully employed temporarily to immunize apparently healthy animals before shifting them from infected to clean ground. In infected countries where animals are travelled long distances by road, and every farm on the route is a common grazing ground, one could conceive that if, in the event of an outbreak, serum were injected into those exposed to infection before moving them on, much might be done to check the spread of anthrax along main roads. As a curative agent, little can be expected from serum, because one seldom suspects anthrax until an animal is found in a dying condition, when it is highly probable the bacilli have already invaded the blood stream. One knows, however, that in outbreaks of anthrax the fatalities are generally few, even when a source of infection exists which there is reason to believe has acted on more than one animal on an establishment. Those in contact sometimes show a febrile condition, which raises in one's mind the possibility of their being also infected. One could imagine that in such cases, a serum might be advantageously employed on the animals in contact, but it must not be forgotten that for curative purposes very considerable doses of such a serum must be used for the larger animals.

Serum may also prove useful in modifying the effects of the vaccine either before inoculation, or when the inoculated give signs of being dangerously affected by the operation. Carini employed serum in this way, but his recorded successes are not brilliant.

Sobernheim states that for protective purposes he has used a combination of serum and culture. The two materials are injected at different parts of the body at the same time, and no second inoculation is required. He also states that 75,000 oxen, sheep, and horses have been operated on by this method with a loss of 0.1 per cent. The objection to such a method is that the protective power of the serum is sometimes so great that the culture fails to act severely enough to give a lasting immunity.

WEST INDIAN PRODUCTS.

Canada.

Mr. J. Russell Murray has forwarded the following review, dated March 19, 1906, of the position of West Indian products on the Canadian market:—

SUGAR.

A fair amount of business has been transacted at prices from \$1.95 to the advanced price to-day of equal to 2½c., c. & f. New York. The arrivals here have been about 6,000 tons during the last four weeks. The general strength in cane sugar prices and also in the beet market is difficult to understand; statistics do not warrant the advance unless the large additional stocks have already been discounted, but the unfavourable weather and labour questions in Cuba may be partly the cause. The advance in beets since the 7th. now equals 3d. for the March options, while the advance here for 96° centrifugals, in about the same period, is about 18c. Muscovado has been sold at relatively good prices; grocery grades are slow of sale.

MOLASSES.

Barbados molasses have been freely bought for Newfoundland, but few transactions have been carried through here for local requirements. One lot of 400 puncheons last season's molasses, changed hands at 26½c. to the refiners. Buyers anticipate prices in their favour before the season is well advanced.

COCOA-NUTS.

A very steady market continues at unchanged prices. New York, however, has declined slightly, and we may follow to a lower figure if larger supplies arrive. Market is reasonably stocked.

SPICES.

Prices remain firm, but business is quiet. Ginger-buyers are now realizing that higher prices will rule. Pimento is without much inquiry. Cloves are in better demand. Nutmegs are in better inquiry.

BROOM CORN.

A sample bale of this product was received from the Botanical Department of Montserrat, and, in size, quality and colour, leaves little to be desired. This product is worthy of attention as a minor industry. The entire supply is at present drawn from the United States. To-day's value is about 6c. per lb. for good, ordinary grades.

Germination of Galba Seeds. A correspondent communicates the following interesting observation on the germination of seeds of the galba (*Calophyllum Calaba*): 'A quantity of galba seed planted on an estate in St. Kitt's about June of last year, apparently failed to grow, and a fresh supply of seed was planted. Both lots of seed started to grow in November. From this it would appear that this seed has a definite time for germinating, which is in November.' This observation received confirmation in Nevis, where a similar course of events was noticed at the Experiment Station. This fact should be born in mind when galba trees are to be raised from seed. It is understood that sorrell seed will remain dormant if planted 'out of season,' and will germinate only about May or June.

KICKXIA RUBBER.

In a recent number of *Tropenpflanzer*, Dr. A. Warburg gives an account of experiments in tapping Kickxia rubber trees in the Cameroons.

Trees five and a half years old were tapped, and they yielded caoutchouc of considerable commercial value, though not of the best quality. Systematic working of trees of this age is not recommended, even though in certain cases it may be profitable.

It was found that one man could collect, from five such trees, about 400 grammes of dry rubber per day, the estimated cost of production being about 18c., and the value in the local market about 38c.

RUBBER IN DEMERARA.

According to the *Demerara Argosy* of March 28, Mr. G. S. Pitcairn, mining engineer, has been granted a license of occupancy for a term of fifty years of 4,000 acres of land on both banks of the Aruka and Kaituma rivers in the north-west district. The width of the tract is not to exceed 75 roods on each side. The principal condition attached to the license is that the holder shall plant rubber trees on the land. The rental has not yet been fixed, but in all likelihood, the figure will be only a nominal one.

Mr. Pitcairn is also in negotiation for the transfer of two other tracts in the vicinity granted to other concessionaires. In the neighbourhood of Mr. Pitcairn's grant is Mr. David Young's, on which 5,000 rubber trees are at present growing. Mr. Young intends planting at least 30,000 trees. It should be mentioned that these are not Para rubber [*Hevea brasiliensis*], but Creole rubber found growing in abundance in the bush. Creole rubber realizes about 91c. per lb. in the English market, as against \$1.32 for Para, but when properly cultivated and prepared, it is anticipated better prices will be obtained. The Commissioner of Lands and Mines, who has recently visited the north-west district, was very much impressed by the progress made by Mr. David Young on his rubber grant in the Aruka.

It may be added that the native rubber trees of British Guiana consist of the 'Hatie' (probably a species of *Hevea*), the 'Touckpong' and 'Cumakaballi,' and a large climbing plant known as the 'Macwarrieballi' (*Forsteronia gracilis*). In the forests near the Brazilian frontier, rubber may possibly be obtainable from one of the numerous varieties of *Sapium biglandulosum*, which is said to yield 'Columbian Virgen' rubber.

DEPARTMENT NEWS.

The Imperial Commissioner of Agriculture embarked on an official visit to the Northern Islands, in the Pickford & Black S.S. 'Orinoco' on Tuesday, April 17. It is expected that the Imperial Commissioner will return to Barbados by the Quebec S.S. 'Parima' on May 2.

Mr. F. A. Stockdale, B.A., Mycologist and Lecturer in Agricultural Science on the Staff of the Imperial Department of Agriculture, left Barbados in the Pickford & Black S.S. 'Orinoco' on April 17. Mr. Stockdale will visit and inspect the Agricultural Schools at St. Lucia and Dominica, returning to Barbados by the R. M. S. 'Esk,' April 29.

MARKET REPORTS.

London,—April 4, 1906. Messrs. KEARTON, PIPER & Co.; Messrs. E. A. DE PASS & Co.; 'THE WEST INDIA COMMITTEE CIRCULAR,'; 'THE LIVERPOOL COTTON ASSOCIATION WEEKLY CIRCULAR,' March 30; and 'THE PUBLIC LEDGER,' March 30, 1906.

ALOE—Barbados, 15/- to 60/-; Curacao, 25/6 to 60/- per cwt.

ARROWROOT—St. Vincent, 1½d. to 2d. per lb.

BALATA—Sheet, 1/4 to 1/11; block, 1/4 to 1/4½ per lb.

BEES'-WAX—£7 5s. to £7 12s. 6d. per cwt.

CACAO—Trinidad, 52/- to 60/- per cwt.; Grenada, 47/- to 52/- per cwt.

CARDAMOMS—Mysore, 7½d. to 3/- per lb.

COFFEE—Jamaica, good ordinary, 39/- to 41/- per cwt.

COTTON—West Indian, medium fine, 6'60d.; West Indian Sea Island, medium fine, 13½d.; fine, 14½d.; extra fine, 16d. per lb.

FRUIT—

BANANAS—Jamaica, 4/6 to 6/- per bunch.

GRAPE FRUIT—10/- to 12/- per box.

LIMES—4/- to 4/6 per box.

ORANGES—Jamaica, 6/- to 8/- per box of 176-200.

FUSTIC—£4 to £4 10s. per ton.

GINGER—Jamaica, 60/- to 65/- per cwt.

HONEY—Darkish to good clear, 16/- to 26/- per cwt.

ISINGLASS—West Indian lump, 2/1 to 2/4; cake, 1/1 to 1/2 per lb.

KOLA NUTS—4d. to 6d. per lb.

LIME JUICE—Raw, 11d. to 1/2 per gallon; concentrated, £18 per cask of 108 gallons; hand-pressed, 2/3 to 2/6 per lb. Distilled Oil, 1/7 to 1/8 per lb.

LOGWOOD—£4 to £4 15s.; roots, £3 10s. to £4 per ton.

MACE—Fair to good pale, 1/7 to 1/9; fair red, 1/4 to 1/6; broken, 1/1 per lb.

NITRATE OF SODA—Agricultural, £11 7s. 6d. per ton.

NUTMEGS—62's, 1/5; 73's, 1/- 84's 10½d.; 96's 8½d.; 106's, 8d.; 116's, 6½d. per lb.

PIMENTO—Fair, 2½d. to 2½d. per lb.

RUM—Jamaica, 2/1 per proof gallon; Demerara, no quotations.

SUGAR—Yellow crystals, 14/- to 16/6 per cwt.; Muscovado, 13/- per cwt.; Molasses, 11/- to 15/- per cwt.

SULPHATE OF AMMONIA—£12 7s. 6d. per ton.

Montreal,—March 19, 1906.—Mr. J. RUSSELL MURRAY.
(In bond quotations, c. & f.)

COCOA-NUTS—Jamaica, \$26.50 to \$28.50; Trinidad, \$25.00 to \$26.00 per M.

COFFEE—Jamaica, medium, 10c. to 11c. per lb.

GINGER—Jamaica, unbleached, 10c. per lb.

MOLASCUIT—Demerara, \$1.00 per 100 lb.

MOLASSES—Barbados, 27c. to 28c.; Antigua, 23c. per Imperial gallon.

NUTMEGS—Grenada, 110's, 18c. per lb.

ORANGES—No quotations.

PIMENTO—Jamaica, 5½c. per lb.

SUGAR—Grey crystals, 96°, \$2.10 to \$2.20 per 100 lb.

—Muscovados, 89°, \$1.60 to \$1.75 per 100 lb.

—Molasses, 89°, \$1.40 to \$1.50 per 100 lb.

—Barbados, 89°, \$1.55 to \$1.80 per 100 lb.

New York,—March 30, 1906.—Messrs. GILLESPIE BROS. & Co.

CACAO—Caracas, 11½c. to 12½c.; Grenada, 10c. to 10¾c.; Trinidad, 10¾c. to 11½c.; Jamaica, 9½c. to 9¾c. per lb.

COCOA-NUTS—Jamaica, \$22.00 to \$24.00; Trinidad, \$22.00 to \$23.00 per M.

COFFEE—Jamaica ordinary, 8¼c. to 8½c.; Black River, 8¾c. to 9c.; Manchester, 10c. to 10¾c. per lb.

GINGER—Dark seraggy root, 9¼c. to 10c.; small white to bright bold, 10¼c. to 12c. per lb.

GOAT SKINS—Barbados, Dominica, and Antigua, 59c. to 61c.; Jamaica, 62½c.; St. Kitt's, 51c. per lb.

GRAPE FRUIT—Jamaica, \$7.00 to \$10.00 per barrel; \$5.00 to \$6.00 per box.

MACE—30c. to 35c. per lb.

NUTMEGS—West Indian, 80's, 22½c.; 90's, 19½c.; 100's, 17½c.; 110's, 15c. per lb.

ORANGES—Jamaica, \$5.00 to \$6.00 per barrel; \$2.50 to \$3.00 per box.

PIMENTO—4½c. per lb.

PINE-APPLES—No quotations.

SUGAR—Centrifugals, 96°, 3.485c. to 3.50c.; Muscovados, 89°, 2.985c. to 3c.; Molasses, 89°, 2.735c. to 2.75c. per lb.

INTER-COLONIAL MARKETS.

Antigua,—April 9, 1906.—Messrs. GEO. W. BENNETT BRYSON & Co., LTD.

SUGAR—\$1.45 to \$1.50 per 100 lb.

MOLASSES—17c. per gallon.

Barbados,—April 7, 1906.—Messrs. T. S. GARRAWAY & Co., and Messrs. JAMES A. LYNCH & Co.,
April 14, 1906.

ARROWROOT—St. Vincent, \$3.80 to \$4.25 per 100 lb.

CACAO—\$11.00 per 100 lb.

COCOA-NUTS—\$10.00 per M. for husked nuts.

COFFEE—\$10.00 to \$10.50 per 100 lb.

HAY—\$1.00 to \$1.20 per 100 lb.

MANURES—Nitrate of soda, \$65.00; Ohlendorff's dissolved guano, \$55.00; Cotton manure, \$48.00; Sulphate of ammonia, \$75.00; Sulphate of potash, \$67.00 per ton.

MOLASSES—15c. to 16c. per gallon.

ONIONS—\$3.00 to \$3.50 per 100 lb.

POTATOS, ENGLISH—Nova Scotia, \$1.92 to \$2.00 per 160 lb.

RICE—Ballam, \$5.25 per bag (190 lb.); Patna, \$3.25; Rangoon, \$2.65 to \$2.75 per 100 lb.

SUGAR—Muscovados, 89°, \$1.45; dark crystals, 96°, \$1.90 to per 100 lb.

British Guiana,—March 28, 1906.—Messrs. WIETING & RICHTER.

ARROWROOT—St. Vincent, \$8.00 per barrel.

BALATA—Venezuela block, 25c.; Demerara sheet, 38c. per lb.

CACAO—Native, 13c. to 14c. per lb.

CASSAVA STARCH—\$4.25 per barrel.

COCOA-NUTS—\$10.00 to \$12.00 per M.

COFFEE—12c. to 13½c. per lb.

DHAL—\$5.50 per bag of 168 lb.

EDDOES—96c. to \$1.44 per barrel.

ONIONS—Lisbon, 4c. per lb. (ex store).

PLANTAINS—12c. to 40c. per bunch.

POTATOS, ENGLISH—\$2.00 to \$2.40 per barrel.

POTATOS, SWEET—Barbados, \$1.08 per bag.

RICE—Ballam, \$4.90 per 177 lb.; Creole, \$4.00 per bag (ex store).

SPLIT PEAS—\$5.65 to \$5.70 per bag (210 lb.).

TANNIAS—\$1.32 per barrel.

YAMS—White, \$2.16; Buck, \$2.16 to \$2.40 per bag.

SUGAR—Dark crystals, \$1.90 to \$2.00; Yellow, \$2.30 to \$2.40; White, \$3.20 to \$3.30; Molasses, \$1.80 to \$1.90 per 100 lb. (retail).

TIMBER—Greenheart, 32c. to 55c. per cubic foot.

WALLABA SHINGLES—\$3.00, \$3.75, and \$5.25 per M.

Trinidad,—April 12, 1906.—Messrs. GORDON, GRANT & Co.; and Messrs. EDGAR TRIPP & Co.

CACAO—Ordinary to good red, \$11.00 to \$11.25; estates, \$11.50 to \$11.90 per fanega (110 lb.); Venezuelan, \$11.75 to \$12.25 per fanega.

COCOA-NUTS—\$20.00 per M., f.o.b.

COCOA-NUT OIL—65c. per Imperial gallon (casks included).

COPRA—\$3.10 to \$3.25 per 100 lb.

DHAL—\$5.00 to \$5.50 per 2-bushel bag.

MOLASSES—18c. per gallon.

ONIONS—\$2.00 to \$2.80 per 100 lb. (retail).

POTATOS, ENGLISH—\$1.20 to \$1.60 per 100 lb.

RICE—Yellow, \$4.60 to \$5.00; White, \$5.00 to \$6.00 per bag.

SPLIT PEAS—\$4.90 to \$5.00 per bag.

SUGAR—Yellow crystals, \$2.10 to \$2.25; molasses, \$2.00 per 100 lb.



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Both these exhibitions are largely assisted by the Dominion Government and are patronized by manufacturers, produce merchants, and others, all over the Dominion, as well as from the United States. The Toronto exhibition, especially, is very largely attended, 'on some days as many as 90,000 to 100,000 people passing the gates.'

In a letter from Messrs. Pickford & Black, published in the *Agricultural News* (Vol. IV, p. 397), it is stated: 'these exhibitions form the very best means of placing the products and resources of the West Indies before the Canadian public, and with this end in view we are prepared to assist in every possible way.'

Messrs. Pickford & Black offer to carry all exhibits from the West Indies to Toronto and Halifax free of charge. They also undertake to arrange for the necessary space and the proper showing of the exhibits. The exhibitors would thus only have to provide the exhibits and pay a share of the cost of erecting booths and stalls for their accommodation.

Messrs. Pickford & Black add, in regard to previous exhibitions in which they took so active a part, 'nothing has ever been done which has so effectually brought the resources of the West Indies before the people of Canada.'

Canadian Exhibitions, 1906.

THE annual general exhibition at Toronto is to be held this year from August 25 to September 8, and the Dominion exhibition is to be held at Halifax from September 22 to October 15.

As is well known, the Dominion Government offers preferential rates for produce grown in these British colonies, and, on this and other grounds, it is desirable that closer commercial relations should be encouraged between the West Indies and Canada. The trade already built up, chiefly by means of the Canadian line

of steamers, is considerable, but there is abundant room for expansion, especially in regard to shipments of sugar, molasses, cocoa-nuts, cacao, coffee, spices, fresh fruits, and other tropical produce.

It is pointed out that the exhibits proposed to be sent to the Canadian exhibitions from these colonies are to be bona fide commercial samples and not curios and fancy articles. The general opinion of those conversant with the subject is that it would be to the advantage of the West Indies to avail themselves as fully as possible of the generous offer made by Messrs. Pickford & Black, in order to place these colonies in a prominent position at both the exhibitions above referred to.

It is understood that active steps are being taken by the several Governments, in association with the Agricultural Societies, with the view of selecting and forwarding exhibits for the Canadian exhibitions. Committees have been appointed, and moderate sums have been provided to defray the necessary expenses. It is estimated that a contribution ranging from £10 to £20, according to the number and character of the exhibits, will be required from each island to defray the cost of erecting booths or stalls, and arranging the exhibits at Toronto and Halifax. The balance of the amount voted would be available locally in providing bottles, boxes, and labels, and in meeting the cost of packing, etc.

For the information and guidance of those entrusted with the work of collecting and packing the exhibits, it may be mentioned that for the Toronto exhibition (August 25 to September 8) it would be desirable that all cured and dried goods (and such decorative material as bamboo stems, dried leaves of the cocoa-nut palm, bunches of cocoa-nuts, dried sugar-cane leaves, ornamental grasses, etc.) should be shipped, if possible, by the steamer due to leave Demerara on June 30, touching at the various islands up to July 16, and arriving at Halifax on July 24; or by S.S. 'Oruro' due to leave Demerara on July 18, and touching at the various islands up to July 30. The 'Oruro' would arrive at Halifax on August 7. A later opportunity for shipping fresh fruit and other perishable commodities would be offered by S.S. 'Orinoco,' due to leave Demerara on July 28, and touching at the various islands up to August 13. This ship would arrive at Halifax on August 21, that is, four days before the exhibition would open at Toronto.

In the case of the Dominion exhibition to be held at Halifax (September 22 to October 15), a convenient

opportunity for shipping fresh fruit and perishable produce would be offered by the Canadian steamer due to leave Demerara on August 22, and touching at the several islands up to September 10. This ship would arrive at Halifax on September 18, that is, four days before the opening of the exhibition in that city.

It may be added that it is proposed to publish a general Handbook of the West Indies for distribution at these exhibitions, and an effort will be made to arrange for the presence of an Agent or Officer of the Imperial Department of Agriculture to attend at Toronto and Halifax in order to afford information in regard to the exhibits and generally assist in making known the resources of the West Indies and the favourable conditions now existing for the mutual exchange of commodities between the two chief groups of British dependencies in the New World.

SUGAR INDUSTRY.

Sugar-cane Cultivation in Cuba.

The *Experiment Station Record* has the following review of a bulletin of the Department of Agriculture of Cuba on the sugar-cane, prepared by Mr. F. S. Earle, Director:—

This bulletin is a general treatise on sugar-cane culture in Cuba, describing the various cane soils of the island; outlining different systems of growing the crop, and reporting the results of several culture and fertilizer tests.

In the prevailing system of culture the cane is planted in hills about 3 feet apart, with a distance of 4·5 to 5 feet between the rows. The soil is prepared and cultivated the first season, but no further tillage is given. The Zayas system requires wider planting, usually 9 by 12 feet, and giving continued cultivation throughout the year with modern implements. Under this system barnyard manure is used, but no commercial fertilizers are applied, and in harvesting, all canes not sufficiently matured for cutting are allowed to remain for later ripening.

At the station the Zayas system failed to produce a maximum first crop as compared with the common system, and the cost of production was greater. The saving of immature canes was also unsatisfactory. It was further found that the cane grown by the common system ripened earlier, and during November averaged about 1 per cent. more of sucrose than the cane grown by the Zayas system. By the middle of December the two lots were practically identical; by the end of February the Zayas cane contained 1·4 per cent. more sucrose.

Results obtained by cane growers at other points also show that the Zayas system does not always give as good yields the first year as the common system. Some consider this due to injury to the roots caused by the continued cultivation. In one test the cost of soil preparation, planting, and cultivation, according to this system, amounted to \$527·86 per caballería (about 33½ acres). Cane grown on red land was slightly better in quality than a crop from black land.

The Naudet Diffusion Process in Trinidad.

The Harvey Engineering Co., Ltd., has addressed to the *Louisiana Planter* the following letter, dated March 24, 1906, with reference to the working of the Naudet diffusion process for extracting sugar from the cane:—

As the makers of the above-named machinery, we think it may interest some of your readers to hear of the progress being made by this new process, which is now at work in the island of Madeira, also in the islands of Trinidad, Porto Rico, and Cuba, in the West Indies. We have just received a few figures regarding the installation we erected last year on Caroni sugar estate, Trinidad, which no doubt will prove interesting to your readers.

This new process was only started for the first time in Trinidad last crop, and is about four times larger than the plant at Madeira, so that this was the first time the process had been installed on a large scale, grinding about 600 tons of cane per day, and, naturally, being entirely new to the people, there were many difficulties and drawbacks in working the process to be overcome, which was to be expected, considering the great revolution this process accomplishes in the manufacture of cane sugar. Still, last year the entire crop was taken off by the Naudet process, and gave a much better result than the previous year, which was done by double-crushing mills. This year a number of important improvements have been made, so that the results are even still better. The owner of the estate writes to us as follows: ‘The alterations and improvements which you have made on your Naudet machinery for this crop have been most satisfactory and gave no trouble at all—in fact, the whole machinery works like clockwork. The average extraction for two weeks was 95 per cent., and last week for two days the extraction was 97·2 and 97·7 per cent. As to the fuel question, we have six boilers and only burn coal under one of them; the other five boilers give ample steam and the only fuel used is the exhausted megass from the Naudet battery.’

From this it will be seen that this new process extracts at least 97 per cent. of the total sucrose in the cane, so that only 3 per cent. of the sucrose is lost, which is a much higher extraction than any nine-roller mill has ever yet been able to attain. The juice is also much purer, as the canes have only passed through one crushing.

As regards the fuel question: we calculate that the coal used under the one boiler will work out at about 1½ to 2 cwt. of coal per ton of sugar made, but this is a small matter when the extra sugar recovered is considered. Also, the manager of Caroni estate informs us that he is in hopes, before the end of the crop, of working the factory without any additional fuel beyond the megass from the Naudet process.

Owing to the juice being limed, superheated, and thus sterilized, within five or ten minutes after being expressed from the mill, and thereafter enclosed entirely from the atmosphere, there is practically little or no inversion whatsoever. The juice is so thoroughly clarified by the circulation through the megass in the Naudet battery, and so freed from all impurities and gummy matters, that, when evaporated, it becomes a syrup which works very freely in the vacuum pans. Therefore, not only is the extraction of the sucrose almost perfect, but the recovery of actual sugar from the juice is also high, so that about 8 tons of cane only are required to make 1 ton of sugar.

Another point is the simplicity and easily controlled operations of manufacture, as no clarifiers, subsidisers, eliminators, or filter presses are used. The juice from the

first mill is immediately limed and heated, passes through the Naudet macerating battery, and, when dark crystals for refining purposes are required, no sulphur is used, but the juice passes on direct from the Naudet battery into the triple effect, and so to the vacuum pans, crystallizers, and centrifugals, in the usual manner; when yellow sugar is required, the juice must be sulphured; when white sugar is desired, then additional sulphuring and Philippe or other bag filters must be used.

These results amply prove that this process is one which will have serious consideration in the future, and place the new process beyond being called experimental, as this estate in Trinidad is now taking off its second crop by the Naudet process in a most satisfactory manner.

Sugar-cane Experiments in Cuba.

Previous results of experiments with varieties of sugar-cane at Central Soledad, Cuba, have already been published in the *Agricultural News* (Vol. II, p. 179, Vol. III, p. 179, Vol. IV, p. 146). It is now possible, through the kindness of Mr. E. F. Atkins, to publish some of the results obtained for the last season at the Harvard Experiment Station in Cuba. The following is taken from a letter dated April 17, 1906:—

I take pleasure in enclosing our report on cane seedlings which I hope may interest you, also the annual analysis of our foreign canes. The past summer was a very dry one, and our garden suffered in consequence, but all the canes were subject to the same conditions, and their comparisons prove useful.

I find that very few of the imported varieties of canes are holding up well in the fields after two or three years; they do not seem to have the same vigour as the Cuban canes. On the other hand, some of them are much more prolific in seed than our own varieties, and now that we have succeeded at last in getting some seedlings, I hope some of the crosses may develop into valuable canes.

The following results were given by the West Indian varieties that had been obtained through the Imperial Department of Agriculture:—

Variety.	Weight of Cane, lb.	Per cent. Extraction.	Per cent.		Quotient of Purity.	Sucrose per 100 lb. Cane.
			Solids	Sucrose		
B. 208 ...	3·12	72·60	21·00	19·50	92·90	14·20
Caledonian Queen ...	3·00	72·90	21·00	20·00	95·20	14·60
B. 645 ...	4·12	74·70	19·60	17·80	90·80	13·30
White Sport... ..	4·75	73·70	19·50	17·70	90·80	13·00
B. 2,885 ...	4·96	71·50	19·50	18·10	92·80	12·90
B. 3,381 ...	2·71	69·20	21·80	20·20	92·70	14·00
B. 109 ...	3·58	71·00	20·90	18·30	87·50	13·00
B. 156 ...	2·84	71·90	20·90	19·60	93·80	14·10
B. 149 ...	3·63	74·10	19·70	18·20	92·40	13·50
White Trnspt. ...	3·38	70·40	20·60	18·90	91·70	13·30
D. 95 ...	2·54	71·30	20·10	18·60	92·50	13·30

These varieties compare favourably with others that are under experiment, and it is particularly interesting to note the improvement shown by Caledonian Queen in purity of juice, whereas B. 208 has given slightly poorer results than previously, owing to an exceptionally dry season.



WEST INDIAN FRUIT.

LIME CULTIVATION.

The following note on the cultivation of the lime is extracted from a recently issued Bulletin of the Hawaii Agricultural Experiment Station entitled *Citrus Fruits in Hawaii* :—

The lime or acid lime (*Citrus medica acida*) is widely grown within the tropics, but because of its extreme sensitiveness to low temperatures is not at all successful in many orange-growing districts. Here in Hawaii it thrives and produces large crops of fruit. It will prosper on rather rocky soils and those too poor for orange cultivation. The propagation is usually by means of seeds only, but budding has been practised to a limited extent, and will doubtless be used more extensively in the future. Seed cannot be depended upon to reproduce exactly the same form as that of the fruit from which it was taken, but for many of the purposes for which limes have been used uniformity of shape, colour, or size is not an essential.

Limes are put to many uses. In the tropics they are freely used as fresh fruit for the making of limeade and in the seasoning of foods. The market for the fruit in this form is increasing in the United States, and the demands of the future for a lime of fine quality and appearance are likely to become increasingly stringent, hence the better forms will be multiplied by budding. At the present time, however, by far the larger number of limes are marketed in the form of so-called secondary products. Considerable numbers of them are preserved in brine and sent to northern markets. Larger quantities are used in the manufacture of lime juice and citric acid, while essential oil is extracted from the rind. The lime juice is obtained by pressing the fruits between rollers, and is usually marketed in large containers. Citric acid is obtained from the concentrated juice, which is made by boiling down in open vessels.

Varieties.—Through prolonged seed propagation several more or less distinct types have been originated. In India, the home of the lime, several named varieties are known. In America, Hawaii, and the West Indian Archipelago the commonest type is that known as the Mexican or West Indian lime. Of this type there are many distinguishable forms, some of which are much larger and finer than the average. But few of them have been named, propagated by budding, and disseminated upon their merits.

Other varieties are the Persian and the Tahiti. The Tahiti is, in Florida, one of the most highly esteemed varieties of lime. The fruit is large, the rind of lemon-yellow colour, the quality of the juice excellent, and there are few seeds or none. The fruit is said to have a tendency to decay on the trees. In California this variety is not a success.

VARIETIES OF THE MANGO.

The following list of the principal varieties of the mango known in Jamaica is extracted from Mr. Wortley's *Fruits and other Food Products of Jamaica*, reviewed elsewhere in these columns :—

No. XI.—Medium-sized; ripens yellowish-green or bright-yellow; kidney shaped; of fine flavour, more acid than others; large-seeded; a favourite fruit.

Bombay.—Round; red and green; fine flesh, with little fibre; small flat seed.

Plum.—Small; round; bright-yellow or red, and green; of fine texture; small seed.

Hairy.—Yellow; oblong; very fibrous; sweet and delicious.

Kidney.—Long, rather flat; green or tinged yellow; little fibre, less mealy than other sorts; decays very quickly.

Black.—Small, fat, oval shaped; green with white bloom; peculiar, pleasant flavour, sweet; little fibre; medium stone; light-yellow flesh; if eaten to excess causes biliousness.

Hog.—Yellow; large, round; consisting chiefly of fibre and water.

Beef.—Very substantial; large, round; dark-green, slightly tinged red; fine texture, very satisfying.

Robin.—Red and dark-green; shiny skin; dark-yellow pulp; very sweet.

Yam.—Very solid; large, round; greenish with slight bloom; close substantial meat.

Turpentine.—Shapes and colours various; some oval and yellow, some almost finger-shaped, with red skins and blue bloom; very sweet, but strong, unpleasant flavour of turpentine.

THE IMPERIAL DEPARTMENT OF AGRICULTURE AND ANTIGUA.

At a meeting of the Antigua Agricultural and Commercial Society held on April 6, his Excellency the Governor presiding, the following resolution was proposed by Mr. A. M. Lee, seconded by the Hon. J. J. Comacho, and carried unanimously :—

This meeting of principal planters and others, having large interests in Antigua, desires to place on record its grateful appreciation of the good and beneficial work of the Imperial Department of Agriculture, its fear that this work may shortly be brought to an end, and its earnest wish that the Government of Antigua will contribute according to its financial ability to maintain the existence of the Imperial Department of Agriculture after September 1908.

STEAM PLOUGHING IN THE WEST INDIES.

In recent numbers of the *Agricultural News* (Vol. V, pp. 67 and 83) mention has been made of the improved machinery in use in the West Indies in connexion with the sugar and other industries. The accompanying illustration shows a steam plough at work on the Caroni estate in Trinidad, and is from a photograph taken by a member of the West Indian Agricultural Conference in January of last year. Steam ploughs have also been in use at the two central factories in Antigua, while, as mentioned in the *Agricultural News* (Vol. V, p. 60), the Colonial Company's plantation Harmony Hall, in Trinidad, has recently been similarly equipped.

The latest issue of the *West India Committee Circular* refers to the use of steam ploughs in the West Indies as follows:—



FIG. 4. STEAM PLOUGHING IN TRINIDAD.

We have received by the homeward mail striking evidence regarding the efficacy of the system of steam ploughing on sugar estates, which has been adopted in two such dissimilar colonies as Trinidad and Antigua. Mr. George Christall, whom we are glad to welcome back in greatly improved health, tells us that on the Caroni estate in Trinidad a considerable area of canes grown on land ploughed by steam has been cut this year, and that the average yield of plant canes per acre has been 34 tons as compared with 23 tons from land cultivated under the old system. The total cost of cultivation of the steam-ploughed lands, after allowing for wages and expenses of English ploughmen, and for 10 per cent. depreciation on the cost of the ploughs, proved to be somewhat less than under the old methods, so that the result is an increase of 50 per cent. in the yield of canes per acre, without any increase in expenditure. In Antigua, steam ploughs are now at work on Belvidere and Gunthorpe's, the two new central factory estates. On the former estate they are ploughing a piece of land which would, otherwise, be practically untillable in its present condition with either ox ploughs or manual labour,

and they are not only ploughing the land, but pulverizing it very satisfactorily. On Gunthorpe's they are also doing excellent work on land which has hitherto defied the old-fashioned methods of tillage. This is all very satisfactory, and with these results before the planters there is a probability of an extension of the system of steam ploughing in the West Indies.

BARBADOS AND TRINIDAD MANJAK.

The following comparison between Barbados and Trinidad manjak is extracted from a report on the San Fernando manjak field, Trinidad, by the Government Geologist, published as Council Paper No. 35 of 1906:—

Specimens obtained from some of the mines in Barbados have enabled some comparison to be drawn between the manjak from that colony and from Trinidad. The evidence obtained amply confirms the theory as to the formation of manjak veins put forward in the former report. Manjak has

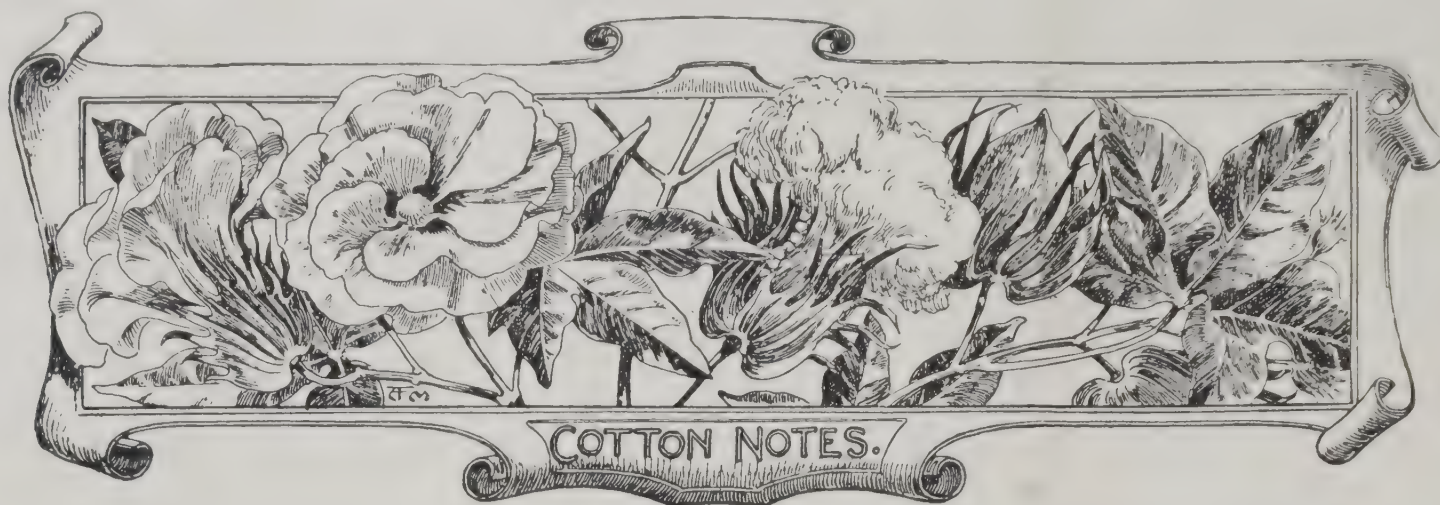
been mined in Barbados at greater depths than have been reached, as yet, in Trinidad, and higher percentages of petroleum are the rule. It appears, however, that this does not depend entirely upon the depths. Barbados manjak has, on the average, a higher percentage of petroleum and a lower percentage of inorganic matter than Trinidad manjak. Consequently it frequently has a lower melting point and a brighter lustre. The columnar variety of manjak exists also in Barbados, occurring as a selvage to the veins of lustrous manjak with conchoidal fracture,

which, however, is the most prevalent type in Barbados.

Precisely similar phenomena are described as characteristic of the Gilsonite veins of Uinta. As in Trinidad, the columnar and conchoidal varieties differ in percentages of petroleum. One Barbados specimen showing both types in contact was analysed, with the result that the columnar variety gave 18 per cent. and the conchoidal 35 per cent. of petroleum. The loss of volatile matter on exposure to the air is also well exhibited by the Barbados manjak.

As the manjak in the San Fernando field is worked to greater depths, and especially when veins which do not crop out at the surface are mined, it may be expected that material equalling the best type of Barbados manjak in lustre and percentage of petroleum will be found.

The value of the exports of manjak from Barbados in the year 1904-5 was £5,012; from Trinidad during the same period there were exported 3,428 tons, of the value of £8,569. Further information on Trinidad manjak will be found in the *Agricultural News*, Vol. III, p. 105.



WEST INDIAN SEA ISLAND COTTON.

The following information, relative to sales of West Indian cotton, is extracted from a letter, dated April 18 last, addressed by Messrs. Wolstenholme & Holland, of Liverpool, to the Imperial Commissioner of Agriculture:—

The top prices we have obtained this season are St. Vincent, 20*d.*; Barbados, 18*d.*; Antigua, 19*d.*; St. Kitt's, 19*d.*; Anguilla, 17*d.*; and Nevis, 15*d.* per lb.

Barbados cotton has been sold up to 18*d.*, but this figure represented a small quantity only, the bulk being about 16*d.* to 16½*d.*; St. Kitt's, 15*d.* to 17*d.*; and Nevis, 13*d.* to 15*d.*

We anticipate a good demand for cotton at 12*d.* to 15*d.*; but it will be difficult to obtain above the latter figure for any quantity.

ST. VINCENT COTTON.

The following information, in continuation of that published on p. 119 of this volume of the *Agricultural News*, with regard to recent sales of St. Vincent cotton, has been communicated by Mr. W. N. Sands, Agricultural Superintendent, in a report dated April 13:—

The following additional sales of lint have been reported: Five bales sold at 19*d.* per lb., 38 at 18*d.*, 3 at 17½*d.*, and 5 at 16½*d.*, making a total of 51 bales.

To date, out of 237 bales reported to have been sold, only 7 have realized less than 17*d.* per lb., and I am of opinion that in each case where the price obtained has been below this figure, the result was due to insufficient attention having been given to the instructions of the Department.

So far, for the season, 312 bales of lint, each weighing 360 lb. net, have been ginned at the cotton factory, and there is enough seed-cotton on hand to give about 15 more, so that the total crop will equal about 327 to 330 bales. Sixty bales were shipped to the British Cotton-growing Association by the R.M.S. 'Eden' on April 11.

COTTON AT ANGUILLA.

His Honour Sir Robert Bromley, Bart., the Administrator of St. Kitt's-Nevis, has kindly forwarded the following extract from a report by Sir Benjamin Pine, Lieutenant Governor of St. Kitt's and Anguilla, published in a Blue Book in the year 1862. This extract deals with the production of cotton in Anguilla.

It is of particular interest as showing that the island seems to-day to be repeating its cotton history of forty years ago on almost identical lines, but, it is hoped, with more permanent results:—

For cotton, however, the soil and climate certainly are

adapted, as that plant, owing to the nature of its root, is capable of enduring a much greater amount of drought than most other vegetables. Accordingly we find that in former times this article was grown in large quantities in the island, and was the chief source of its prosperity. I may mention that in the *Penny Cyclopædia* (article 'Cotton') it is stated that it was from this island that the famous Sea Island cotton was taken to America, and the statement is confirmed by the tradition of the island. The cotton was, of course, not indigenous to the island, and it is not known how it came there, but the fact above mentioned is enough to show the fitness of its soil for the production of the finest kind of cotton known to exist.

Prospects as to Cotton.—With these natural sources of prosperity, I cannot help thinking that the condition of the island admits of great improvement. There are already some signs of reviving industry and enterprise among the people. Cotton again is exciting attention. Upwards of 60 acres of it are now under cultivation; and last year a quantity of the value of about £400 was shipped. It would be cultivated much more extensively were it not for the extreme poverty of the people, who have not the means of buying gins and other things required for its preparation.

To meet this inconvenience, I proposed to the vestry that they should vote a small sum of public money for the purpose of purchasing two or three gins, which should be set up in central places, and of which every grower might have the use upon payment of a small sum to Government towards defraying the expenses.

The vestry gladly adopted my proposal, and I have written to the Chairman of the Cotton Supply Association in Manchester, setting forth the advantages of Anguilla as a field for the growth of cotton, and requesting him to have the kindness to cause the required machines to be sent out.

THE DROUGHT AND COTTON PLANTS.

Cotton in Barbados is at present suffering severely from the effects of the prolonged drought. In many fields there is scarcely any sign of leaves, while in the best fields the usual growth of young shoots from the base of the plants is almost absent. A little cotton is being picked on some estates, but it is only of inferior quality. This will affect the crop returns to a considerable extent, as the second picking in Barbados is usually of a very satisfactory character. Should good rains now fall and start new growths, there would be no chance of a crop until about the middle of July or the beginning of August. To continue the cultivation of the old plants cannot be recommended, and in view of this some of the planters are at present clearing the fields of the old cotton plants and getting ready for the new crop.



AGRICULTURAL EFFORTS AT DOMINICA.

The Imperial Commissioner of Agriculture attended a conference of the members of the Agricultural Experiments Committee at Dominica at the Court House, Roseau, on Friday April 27. His Honour the Administrator (Mr. W. Douglas Young), the Hon. Dr. Francis Watts, Dr. H. A. Alford Nicholls (the President of the Agricultural Society), Mr. Joseph Jones (Secretary), and others were present.

EXPERIMENT PLOTS.

A review of the position of the several cacao experiment plots was placed before the committee by the Commissioner showing the results in continuation of those placed on record in the *Annual Report* for the year 1904-5. It was decided to relinquish the peasant plot at Carse O'Gowrie (La Plaine), also the experiment plot at Point Mulâtre. The latter had demonstrated the value of good methods of dealing with young and old cacao trees, and the health and condition of the plants had steadily improved. On the recommendation of the committee it was decided to continue for another year the experiment plots at Picard (Hatton Hall) estate, Clark Hall, Moore Park, and Riversdale (on the Imperial Road). It was also resolved to continue efforts at the orange experiment plots at Corona and at the lime experiment plot at St. Aroment.

The rubber experiment plot in the neighbourhood of the Imperial Road having proved a failure owing to the unsuitable character of the locality, it was decided to abandon it. On the other hand, the line of rubber trees planted on each side of the Imperial Road, where the conditions were favourable, had done well and was to be continued. In view of the excellent reports on recent samples of rubber grown at Dominica, the prospects of the rubber industry were regarded as very promising.

INCREASED DEMAND FOR PLANTS.

The Imperial Commissioner in response to the opinion expressed by the members of the committee stated his intention to recommend the extension of the nurseries for the supply of cacao and lime seedlings, provided it was shown that they could be disposed of at not less than cost price. The demand for lime seedlings was unprecedented, but every effort would be made to meet reasonable requirements, especially of new settlers.

VISIT OF DR. WATTS.

It was arranged that the report on the results of the proposed visit of Dr. Watts to the outlying districts and to the several experiment plots would be placed before the committee and discussed at their next meeting.

HINTS ON CACAO CULTURE.

The committee suggested that a further address by the Imperial Commissioner of Agriculture on cacao cultivation, for the guidance and information of new settlers and others, would be likely to be of value. It was mentioned that the first address on the subject was delivered as long ago as 1886 and a second in 1899. The Imperial Commissioner promised to accede to the wishes of the committee and an address will probably be arranged to be delivered under the auspices of the Agricultural Society at the Court House later in the year.

BACTERIAL DISEASE OF TOMATOS.

A report on the occurrence of a bacterial disease of tomatos in St. Lucia has already appeared in the *Agricultural News* (Vol. IV, p. 43). This disease is due to *Bacillus solanacearum* and causes sudden wilting of the foliage and the subsequent death of the plant. The following is taken from Leaflet No. 152 issued by the Board of Agriculture and Fisheries, London, and shows that a bacterial disease of the fruits is well known in France and is at present spreading in England:—

This disease has long been known in France, where, during certain seasons, it has assumed the proportions of a destructive epidemic. A single example was received at Kew some years ago for identification, since which time until the present season its occurrence in this country has not been noted. Quite recently, however, examples of the disease have been received from three widely separated localities, which suggests that it has invaded this country in earnest.

The symptoms are very marked and cannot be confounded with those of any other tomato disease at present known. When the tomato is about the size of a marble a minute, blackish patch first appears at the base of the style. This patch gradually increases in size, retaining a circular outline, until eventually the entire fruit is reduced to a blackish, soft, decayed mass.

Experiments have shown that infection takes place during the flowering stage, and that the bacteria causing the disease are deposited on the stigma by flies visiting the flowers.

The stigma appears to be the only vulnerable part under ordinary conditions; nevertheless, if bacteria from a diseased fruit are introduced into the flesh of a healthy tomato at any point of its surface by means of the point of a very fine needle, infection follows.

This disease does not appear to be influenced to any extent by the forcing method of cultivation commonly followed, as it has been observed in a house where the temperature was kept comparatively low.

When the disease appears all diseased fruit should be removed as quickly as possible, and not be allowed to decay and liberate the bacteria present in the tissues. Insects should also be excluded by using an insecticide. This last act would necessitate artificial pollination with a camel-hair brush.

This latter disease is also prevalent in St. Lucia and the following information with reference to it has been furnished by Mr. J. C. Moore, Agricultural Superintendent, St. Lucia:—

We had to destroy the other day our plot of tomatos, as most of the young fruits were infected with this disease, and its appearance in other local gardens has made it necessary for me to recommend the early destruction of all infected fruits.

I have noticed this disease here for the last two or three years, but not to such an injurious extent as at present.

Wherever tomatos are grown these diseases should be carefully watched for, all insects that injure the plants should be destroyed and all diseased plants disposed of either by burning or burying with lime as early as possible.

EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming, should be addressed to the Commissioner, Imperial Department of Agriculture, Barbados.

All applications for copies of the 'Agricultural News' should be addressed to the Agents, and not to the Department.

Local Agents: Messrs. Bowen & Sons, Bridgetown, Barbados. *London Agents:* Messrs. Dulau & Co., 37, Soho Square, W., and The West India Committee, 15, Seething Lane, E.C. A complete list of Agents will be found on page 3 of the cover.

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Agricultural News

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NOTES AND COMMENTS.

Contents of Present Issue.

Particulars are given in the editorial of this issue as to the exhibitions to be held in Canada this year. There will be the annual exhibition at Toronto from August 25 to September 8, to be followed by the Dominion exhibition at Halifax from September 22 to October 15. It is recommended that the West Indies should assist Messrs. Pickford & Black to secure a prominent position for them at both these exhibitions.

The operations of the Naudet diffusion process for sugar extraction are being watched with considerable interest throughout the sugar-growing world. Information is published on p. 147 which goes to show that the process has given very satisfactory results in Trinidad and has now passed the experimental stage. On the same page will be found a statement as to the results of growing West Indian seedling canes in Cuba.

The illustrated article on steam ploughing in the West Indies (p. 149) will also be of interest to sugar planters. Satisfactory results having been obtained in Trinidad and Antigua, it is probable that there will be an extension of this system of tillage.

Further information with regard to the sales of West Indian Sea Island cotton appears on p. 150.

On p. 154 there are illustrated articles of interest in regard to West Indian insect pests. Attention might also be drawn to the illustration showing the powder bellows for distributing Paris green.

Useful hints as to the judging of fruits and vegetables at agricultural shows appear on p. 155.

West Indian Bulletin.

The first number of Vol. VII of the *West Indian Bulletin* will be ready for distribution in the course of the next few days. It will contain a number of papers of general interest to West Indian planters. These include a paper by Dr. Francis Watts on the Agricultural Industries of Montserrat, and one reviewing the Cotton Industry in the Leeward Islands. There are also two interesting papers on entomological subjects.

Exports of Dominica.

It is of interest to pass in brief review an official statement of the exports of Dominica during the year 1905. A similar review for the previous year will be found in the *Agricultural News*, Vol. IV, p. 152. There it was stated that the most valuable product of the island was cacao, the exports of which, in that year, amounted in value to £21,325.

In spite, however, of an increase in the exports of cacao, the first place is now taken by concentrated lime juice, of which 124,625 gallons were exported, the value being £26,483, as against £17,792 in 1904. The output of cacao has increased from 9,880 cwt. to 11,840 cwt., the value for the year being placed at £25,554. The exports of other lime products were as follows: raw lime juice (164,475 gallons), £5,483; fresh limes (13,564 barrels), £4,747; lime oil, £1,947; pickled limes, £241. It will thus be seen that the lime industry was worth £38,901, as compared with a total of £28,986 in the previous year.

Tobago, Hints to Settlers.

A useful little handbook on Tobago, containing hints to settlers, has been prepared and will be issued in the course of the next few days as No. 41 of the Pamphlet Series of the Imperial Department of Agriculture. It is of a similar character to that prepared for Dominica by Mr. H. Hesketh Bell (Pamphlet Series, No. 24). It contains, however, a map of the island and ten full-page illustrations. The text of the pamphlet was prepared by Mr. James Todd Rosseau, the Magistrate and Warden of Tobago, with the assistance, in regard to cacao and rubber cultivation, of Captain M. Short, the Chairman, and Mr. Harry Smith, the Secretary, of the Tobago Planters' Association.

As is shown in another column, the value of the exports of Tobago is increasing. The cacao industry of the island is very promising, while it appears that the cultivation of rubber, which is a comparatively new industry, is likely to give good results. Cotton is an industry well suited to the south-western district of the island.

Appendices contain valuable information in regard to the cost of bringing 100 acres of forest land into full bearing in cacao. The capital necessary is £2,000 to £3,000. There are favourable openings for young men possessing the necessary capital and energy to start cultivations of cacao, rubber, cotton, and other crops in Tobago.

Rubber Trees and Cacao.

A good deal of interest is being taken in Grenada, St. Lucia, and Dominica, in the cultivation of rubber trees, and the question has been raised whether it would be advisable to plant rubber amongst established cacao.

The general view is that when the cacao trees cover the ground and do not require overhanging shade, it would be undesirable to plant rubber trees amongst them.

On the other hand, rubber trees may be usefully planted in open spots, or in ravines in the neighbourhood of cacao fields, so as to give side shade and shelter, but without interfering with the growth and yield of the cacao trees.

The drawback when rubber trees are planted alone is the long waiting before any crop is reaped, whereas if planted with young cacao, as is being done at Tobago and elsewhere (see *West Indian Bulletin*, Vol. VI, pp. 139-49), there is likely to be some return from the cacao in four or five years, while the return from the rubber trees cannot be expected under about seven to nine or even ten years.

Growing Oranges in the Plains of Jamaica.

A recent issue of the *Jamaica Gazette* contains interesting correspondence on the subject of growing oranges in the plains. In the majority of cases in which this cultivation has been attempted in the lowlands, efforts have not proved successful. Dr. H. G. Tillman, who has an orange grove in the plains of Vere, has given the matter very careful attention and has met with the most gratifying success. He has shown that, by scientific cultivation, the pruning of roots and branches, and the intelligent application of irrigation, it is possible so to regulate the early bearing of the trees as to obtain the full advantage of the demand that arises for oranges in the English and American markets in August and September.

Briefly stated, Dr. Tillman's method is as follows: Early in November all the fruit is picked from the trees. Ploughing in the intervals between the trees is then commenced, three cuts being made on each side. The fine roots are thus subjected to a process of pruning. The trees are also cleaned by the removal with a pair of scissors of all infested leaves. For six weeks, viz., during November and part of December, no water is allowed near the trees, which consequently enjoy a period of rest. The application of water, about the middle of December, is followed, some three weeks later, by the blossoming of the trees. All blossoms will be picked off after the middle of March to save the trees carrying late fruit needlessly.

Dr. Tillman's account sales show that in August he obtained 15s. to 16s. per box; in September, 14s. to 14s. 3d.; in October, 11s. to 12s.; and in November, 10s. to 11s. In December the fruit realized only 8s. to 9s. per box. As it costs 6s. to place a box of oranges on the market, it will be seen that good profits can be obtained by the production of early fruit.

The Fertility of Tropical Soils.

The *Grenada Chronicle* of April 21 contains an article taken from Fitzgerrell's *Guide to Tropical Mexico* entitled 'Why Tropical Soils are Fertile.'

The writer points out that ordinary soil analysis fails to account for the extraordinary fertility of tropical soils in that it is unable to give any idea of the condition of the soil as to bacterial life. It is now generally recognized that bacteria are largely responsible for the chemical changes that take place in the soil.

Difference in climate is vaguely assigned as the reason for the greater fertility of the tropical soils as compared with the soils in colder climates. The fact is that in the former soil bacteria (especially those responsible for nitrification) are much more active.

'Cultivation and methods, that in the north would quickly exhaust the best of soils, here in the tropics have but little bad effect for a generation.'

Fruit-canning Industry.

The question is frequently asked: Why do the West Indies not establish a fruit-canning industry? So far, no practical results have followed the suggestions that have been put forwarded with this object. In an article in a recent issue of the *Demerara Argosy* the possibilities of the industry are discussed, and the above question is fully replied to so far as British Guiana is concerned.

The views of those who have given the subject some thought, which were elicited by a representative of the journal, are to the effect that under existing circumstances a canning factory could not be run as a profitable enterprise for several reasons. The first of these is that fruit is not cultivated in British Guiana in commercial quantities.

The next point is that the fruit of the colony is not of sufficiently good quality. It was once described by a visitor as 'all wild.' Little or no attempt is made to select and sow the best varieties. For example, there is only a very limited supply of really good mangos; the common kinds are 'stringy' and of bad flavour and quite unsuitable for this purpose. The only fruits in the colony that would be likely to lend themselves to preserving are pine-apples and guavas. In the case of the former, 'local growers would have to win a place for themselves in competition with the owners of tropical farms in Florida, Australia, the Straits Settlements, and elsewhere.' And in regard to guavas it is stated: 'Guavas are simply growing wild, and there is no systematic cultivation of the right kinds, of which there are a great many, some more suitable for canning than others.'

The opinion is also expressed that the absence of a reliable labour supply would also operate against the success of a fruit-canning enterprise. Before the suggestions could receive serious consideration it would have to be shown how these difficulties could be met, and that planters and peasants were willing and able to produce an adequate supply of fruit of good quality.



INSECT NOTES.

Two Tree Borers.

During the past two years several trees of the Barbados ebony (*Albizzia Lebbek*), or woman's tongue, as it is frequently called, have been observed in a dead or dying condition in Barbados. In all the cases that have been examined the trees have been attacked by borers. Figures 5 and 6 are from photographs of sections of the trunk of an *Albizzia* tree in Barbados that had been attacked by borers and had died. These borers were of two kinds; one of them (*Chlorida festiva*) is a green beetle with a gold stripe running lengthwise of the wing-covers near the outer border. The legs are light brown and the antennae, which are longer than the body, are dark brown. Each wing-cover is provided with two small spines at the tip. Fig. 5 shows the appearance of the tunnels made by this insect, which are not cylindrical and frequently open out into wide chambers.

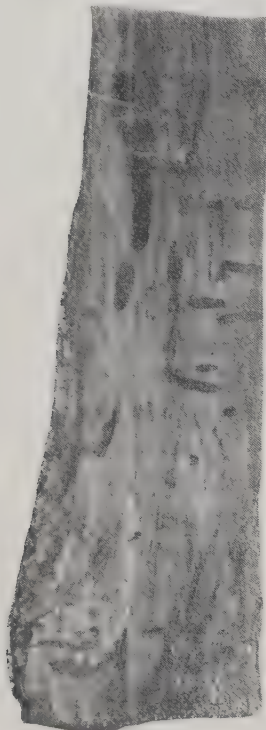


FIG. 5. SHOWING TUNNELS MADE BY *CHLORIDA FESTIVA*.

Fig. 6 shows the tunnels of the other principal borer in the *Albizzia*. These burrows are cylindrical, uniform in size, extending in all directions through the wood. The tunnels of (*Chlorida festiva*), on the other hand, are generally confined to the young sapwood and rarely penetrate directly toward the centre of the stem. The insect, the work of which is represented in fig. 6, has not yet been identified. The adult is a long, slender, black insect, $1\frac{1}{4}$ to $1\frac{1}{2}$ inches in length, the wings are small, not reaching more than two-thirds the length of the abdomen. They are weak in flight and can rise but little. The larva attains a length of $1\frac{1}{2}$ inches or more, is nearly cylindrical, and of uniform size, except that the head and first segment of the thorax and the last two abdominal segments are longer than the others. The last two abdominal segments are enlarged in such a way that the larva is able to use them in travelling by pressing them out against the sides of the tunnel in which it lives.

The thoracic legs are well developed, but the antennae are very small. The eyes are large occupying nearly the entire head. As soon as the name of this insect is ascertained it will be published for the benefit of readers of the *Agricultural News*.

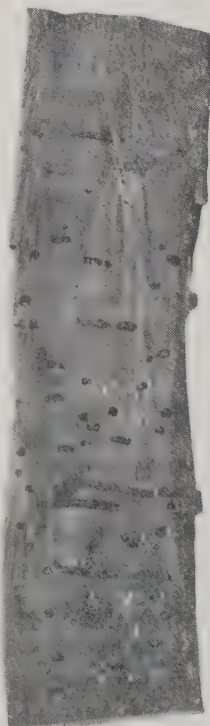


FIG. 6. SHOWING CYLINDRICAL TUNNELS MADE BY THE BLACK BORER.

Acme Powder Bellows.

On p. 90 of the present volume of the *Agricultural News* a short account was given of the 'Acme Powder Bellows' for applying Paris green to cotton and other crops. The accompanying illustration will serve to give an idea of the construction of this simple, but useful machine.

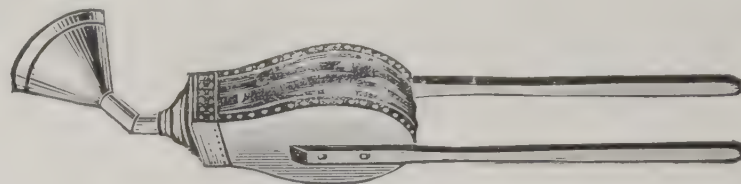


FIG. 7. ACME POWDER BELLOWS.

The following description may be quoted from the previous article:—

'One of these machines, which is marked the 'Acme Powder Bellows,' has been obtained by the Imperial Department of Agriculture. It is a very simple hand bellows with handles about 18 inches long, and with a funnel at the nozzle end. About $\frac{1}{4}$ lb. of Paris green is used as a charge for the machine, and it is thrown out by quick pressure on the handles. A small inverted cone inside the funnel helps to spread the poison, which comes out with some force, and with a good tendency to spread. The cost of this machine should be small, and it seems likely that a labourer will be able to accomplish much more with it than with the bag, which is ordinarily used. Field experiments are, however, necessary to prove its value when used on a large scale. According to the printed directions which accompany each bellows, only pure Paris green should be used, but from the few trials already made, it seems likely that the mixture of lime and Paris green, which is used in the West Indies, could be satisfactorily applied by means of this machine.'

Inquiries have been made as to the cost of the 'Acme Powder Bellows.' They can be obtained in the United States at a cost of about \$8 per dozen. Messrs. Gillespie, Bros. & Co., 4, Stone Street, New York, have been asked to be prepared to execute orders from the West Indies for these machines and also to quote inclusive terms, f.o.b. New York. The information, when to hand, will be published in the *Agricultural News*.

INCUBATOR TRIALS AT ST. LUCIA.

Mr. J. C. Moore, Agricultural Superintendent at St. Lucia, has forwarded the following notes upon the satisfactory results that have attended carefully conducted trials, carried out at the Agricultural School, of a Cyphers Non-moisture Incubator, No. 0., of 60-egg capacity:—

On the first trial 90 per cent. of the fertile eggs hatched, and on the second 78 per cent., an average of 84.3 per cent. All the chickens hatched were strong and healthy and are thriving. To accommodate the young chickens for the first few weeks, a simple 'Brooder' was constructed out of a kerosene box by tacking on the inside, in concentric circles, strips of flannel to hang down within $\frac{1}{4}$ inch of the floor of the box, for the chickens to nestle in at night. This 'Brooder,' if placed in an out-house or closed coop, answers very well.

The operation of the incubator is very simple, and involves little trouble, a few minutes' attention each day being all that is necessary. In our trials the machine was housed in the basement of a stone building.

JUDGING FRUIT AND VEGETABLES AT SHOWS.

Mr. T. R. Sim, F. L. S., Conservator of Forests, contributes to the *Natal Agricultural Journal* a useful paper on the above subject. The writer refers to the difficulties experienced at agricultural and horticultural shows resulting in part from inaccurate working of the prize list and regulations and in part from the absence of a recognized set of principles guiding both exhibitors and judges.

The following points are given as of first importance :—

Exhibits should be strictly in accordance with the rules of the society, and any departure therefrom should disqualify.

Each specimen should belong without doubt to the class in which it is exhibited.

The presence of insect pests should disqualify. If plants or fruits are in such condition through presence of pests that they would not be allowed to enter or leave the colony under the import regulations of this and adjoining colonies, they are unfit for an exhibition table. So, also, fruit infested with maggots is unfit for show and should disqualify.

Excellence in the exhibit itself should receive attention rather than the way in which the exhibit is shown.

Each article shown should be in proper condition for exhibiting. This includes that, unless otherwise specified, fruit should be fit for immediate use and vegetables fit for cooking or salad.

The prizes should be awarded according to the general excellence of the exhibit. By this I mean that all exhibits should be judged on the principle of giving the prize to the one that excels in the majority of the points by which that kind of exhibit is always judged rather than any special point.

Societies should avoid offering prizes for classes which are not in season at the date of the show, as this reduces the money available for other classes, and usually brings forward only wretched material, if any.

Where a number of specimens are wanted of a kind, they should be all of one variety.

FRUIT.

Condition.—Dessert fruit should be ripe and mellow and fit for immediate use, except in cases where fruit for keeping or export is required. Culinary fruit should be in the condition in which it is required in the kitchen. Fruits which do not mature on the tree, or which mature as well or better when stored after being pulled, should still be in mellow condition, brought about by such means. This includes most apples, pears, mangos, custard apples, and bananas, and does not exclude citrus fruits so treated.

Size and colour both require attention in different degrees in the various subjects. Size without even grading and without fine surface counts but little ; with these, so long as coarseness is avoided, it is a useful quality.

Fruits showing rough form, plucking without the stalk, or injury of any kind, should lose marks, while scale, scab, etc., on the surface or maggots inside should disqualify.

Where fruit fit for keeping or export is required, the stage of ripeness to suit the proposed storage is most important. This may vary in accordance with the market proposed to be supplied.

VEGETABLES.

With vegetables, as with other classes, condition and quality are essential.

Form is generally important, neatness in this respect being always in demand.

Cleanness is another essential. Generally this refers to freedom from the attacks of insects and the absence of superfluous roots.

Flavour is also important.

Size counts for little in most cases, though, of course, size combined with other qualities gives added value.

It will be seen that to be an efficient judge one requires a practical knowledge of all the classes he has to judge, not only as they appear on the market or exhibition table but also through every stage of earlier development. This can only be obtained by having grown and shown personally.

EXPORTS OF TOBAGO.

In forwarding to the Imperial Commissioner of Agriculture a copy of the return of produced shipped from Tobago during the year ended March 31, 1906, Mr. J. T. Rosseau, the Warden, writes as follows :—

As you will observe the total is nearly £30,000, an increase of £5,000 over the previous year.

The return of cacao is, I think particularly satisfactory, 2,500 bags of 165 lb. each, as against 1,050 for last year. It is true the crop last year was very short—500 bags less than the previous year—but still the increase is substantial.

There was also an increase of £1,000 in the value of cattle exported. Cotton, too, has increased, though the amount is still small.

The Government has loaned to Dr. Latour one of the Sea Island cotton gins, on condition that he gins, free of charge, any cotton brought to the mill by the peasantry, so I hope a much larger area will be planted this year.

The following table shows the quantity and value of the exports of some of the products of Tobago during the year ended March 31, 1906 :—

RETURN OF PRODUCE SHIPPED FROM TOBAGO, 1905-6.

				Quantity.	Value.
					£ s.
Cattle	...	...	...	621	3,726 0
Cacao (lb.)	...	...	...	412,706	9,457 17
Cocoa-nuts	...	...	...	142,207	248 17
Cocoa-nut oil (gals.)	...	...	...	10,520	1,588 0
Copra (lb.)	...	...	...	96,852	807 2
Cotton (lb.)	...	...	...	12,968	824 5
Cotton seed (lb.)	...	...	...	25,345	52 16
Eggs (doz.)	...	...	...	5,218	260 18
Fowls (doz.)	...	...	...	2,194	1,645 11
Fruit (lb.)	...	...	...	51,495	128 14
Goats	...	...	...	1,575	472 10
Horses	...	...	...	80	1,000 0
Molasses (gals.)	...	...	...	14,340	621 8
Pigs	...	...	...	1,813	1,359 15
Rubber (lb.)	...	...	...	486	72 18
Sheep	...	...	...	128	102 8
Sugar (lb.)	...	...	...	574,500	2,987 6
Tobacco (lb.) *	...	...	...	8,172	408 12
Turtle (lb.)	...	...	...	14,622	365 11
Turtle shell (lb.)	...	...	...	609½	380 19
Vegetables (lb.)	...	...	...	778,019	3,241 14

* There is some doubt as to this item.



GLEANINGS.

It is stated in the *West India Committee Circular* that the consumption of cacao in the United States has been as follows during the last six years: 1901, 18,630; 1902, 21,922; 1903, 25,230; 1904, 29,357; 1905, 33,125 tons.

The *Maritime Merchant* (Montreal) of April 19 states: 'There is a good inquiry for oranges, these being the only green fruits that the trade can fall back upon at the moment. Jamaicas, of course, are very choice for those who are willing to pay the price.' Jamaicas are quoted at \$7.00 per barrel.

It is stated in the *Annual Report* on St. Lucia for 1904 that 'a fairly large number of boats is engaged in fishing round the coast of the island, but solely for the purpose of supplying the local market, and no attempt is made at preserving for export purposes.'

A writer in the *Comptes Rendus*, 1905, No. 8, gives a botanical description of a new coffee from Central Africa. It is known as *Coffea excelsa*, which grows 18 to 60 feet high. The product is said to be among the best sorts known at the present time.

The company which is erecting a logwood factory in the parish of St. Elizabeth, Jamaica, has, says the *Jamaica Gleaner*, 'acquired a handsome little launch of 15 horse power in order to take their products down the river to the port.'

The *London Standard* of January 11 last contains a summary of a paper by Dr. Francis Watts in the *Agricultural News* (Vol. IV, p. 395) on the subject of the treatment of orchard soils, 'as his remarks are not without interest to fruit growers in this country.'

The *Cotton Trade Journal's* English letter, dated Manchester, March 28, says: 'The demand for Sea Island yarn is moderate with no great animation. Spinners of thread yarns are busy, as are those who make yarns of very high counts. The West Indian cotton is now coming in and is fetching good prices. Last week 210 bales were sold at 14½d. to 19d.'

At a meeting of the Legislative Council of Jamaica on April 18, the Government introduced a bill to ensure that all distilleries erected after that date, and all distilleries which might be re-constructed after the passing of the law, should be fitted with locked stills. The motion for second reading was defeated. A report on the results of the installation of a locked still at Denbigh estate as an experiment has already appeared in the *Agricultural News* (Vol. V, p. 37).

The Imperial Commissioner of Agriculture is desirous of obtaining copies of the *West Indian Bulletin*, Vol. IV, no. 3, the supply of which has run short. The sum of 1s. per clean copy will be paid. Persons willing to dispose of copies should communicate with the Agents of the Department or direct to the Head Office, Barbados.

During the fortnight ended April 12, 457 bales of West Indian cotton were imported into the United Kingdom. Medium fine is quoted in Liverpool at 6.75d. per lb.; West Indian Sea Island, medium fine, 13½d. per lb.; fine, 14½d. per lb.; and extra fine, 16d. per lb. Prices paid—9½d. to 18d. (*West India Committee Circular*, April 18, 1906.)

Messrs. Elders & Fyffes (Ltd.) announce that for the three months ended March 31 last the total importation of bananas amounted to 1,182,200 bunches, as compared with 878,987 bunches during the same period in 1905, showing an increase of 303,263 bunches. Of this increase Jamaica and Costa Rica bananas accounted for 275,453 bunches, and Canary bananas for 27,810.

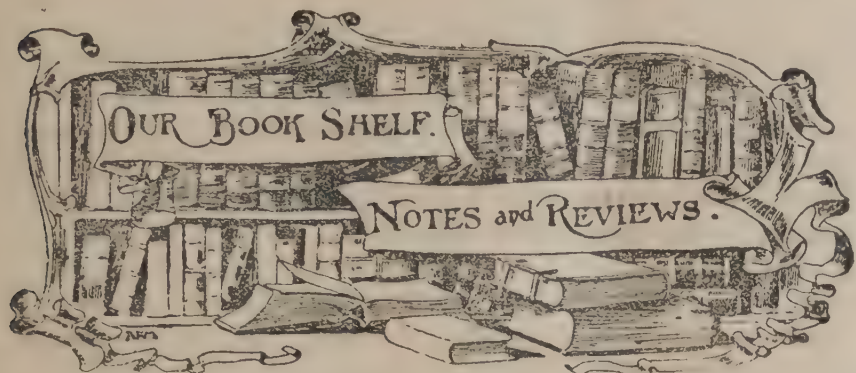
The *Montreal Gazette* of April 17 tells the story of a supposed wonderful illustration of the indestructibility of life. It is related that some beans were taken from the coffin of an ancient Egyptian, being probably 2,000, to 3,000 years old. One of these beans, on being planted, germinated and produced a plant. It is doubtful if this story is any more reliable than those connected with the germination of wheat taken from the mummies.

A pamphlet on the West Indian Fruit Industry, by Mr. W. G. Freeman, A.R.C.S., B.Sc., F.L.S., Superintendent of the Colonial Economic Collections at the Imperial Institute, London, has been recently issued as a reprint from the *Journal of the Royal Horticultural Society*. The substance of this paper was delivered by Mr. Freeman at the Society's show of colonial-grown fruit in December 1904. The pamphlet contains a number of excellent illustrations of West Indian fruits.

A number of eggs of Barred Plymouth Rock and White Leghorn Fowls are available at the Agricultural School, St. Lucia, for hatching purposes at 3s. per dozen. Chickens, either pure or first crosses, of these breeds are on sale at from 1s. to 2s. 6d. each, according to age. Belgian hares are sold for breeding purposes at 4s. 2d. per pair. Orders should be forwarded to the Agricultural Superintendent. Packing will be charged for extra.

Mankowski reports in the *Centbl. Bakt.* that a mite was found infesting mosquitos in Bessarabia. In a review of this paper the *Experiment Station Record* states: 'From one to six parasites were found on each infested mosquito, and about 30 per cent. of all mosquitos studied were infested. The importance of this parasite appears to be quite great, since the number of mosquitos and the extent of malaria were considerably reduced during the year.'

A well attended conference of cotton growers was held at Barbados on Friday, May 4. The Imperial Commissioner of Agriculture briefly reviewed the position of the industry at Barbados, mentioning some of the most important points that required the attention of growers. A number of gentlemen present took part in the discussion which followed. On the suggestion of the Hon. Sir Daniel Morris, the meeting was adjourned to the 11th. inst. to secure full and complete discussion of the points raised.



FRUITS AND OTHER FOOD PRODUCTS OF JAMAICA: By E. J. Wortley, Assistant Chemist in Jamaica. *Jamaica: The Gleaner Company, Ltd., 148, Harbour Street, Kingston, 1906.*

Former issues of the *Agricultural News* (Vol. IV, p. 254, and Vol. V, p. 93, have contained notices of previous pamphlets of interest from the pen of the same author. In the pamphlet under review, Mr. Wortley has brought together notes and descriptions of most of the fruits and food products of Jamaica, primarily for the use of the many visitors to the island, who frequently experience difficulty in obtaining accurate information on these matters.

By taking 'a somewhat liberal view of what may be included among the fruits of Jamaica,' the list has been made as complete as possible, and the 'Notes' are likely to be much appreciated by those for whom they have been primarily prepared, while many residents in the West Indies will find here a handy little book full of useful information as to West Indian products.

The pamphlet is illustrated by two large plates containing ninety-seven figures, mostly from photographs taken for the purpose, and most of the fruits mentioned in the text are shown. A useful feature of these plates is that each is provided with a scale, which 'is in exact proportion to the fruits on the plate. This will enable the natural size of the fruit to be judged at a glance.'

In the case of some of the fruits, Mr. Wortley gives a useful list of the principal varieties; for example, about a dozen of the best-known varieties of the mango are described as to appearance, texture, flavour, etc.

Unfortunately, the pamphlet contains rather a large number of typographical errors, due, no doubt, as the author states in the preface, to its being passed through the press rather hurriedly. Presumably these will be corrected in future editions.

CEYLON HANDBOOK AND DIRECTORY: By J. Ferguson, C.M.G., M.L.C. *Colombo: A. M. & J. Ferguson, 1905-6.*

An interesting feature of this useful publication is a review of the planting enterprise up to July last. Attention is particularly directed to the statistics indicating the rise and spread of the rubber-planting industry, which has made such strides in Ceylon within the past twelve months.

In comparison with two years ago, the statistics show that the total area devoted to cultivation has increased by about 20,000 acres, due to an increase of land in rubber of 27,000 acres. 'Writing in January 1905, in his Annual Report, Dr. Willis estimated the total area covered by rubber-yielding trees of all species in Ceylon at 25,000 acres, and now, six months later, our estate returns work out to an equivalent of 39,383 acres.' The following figures indicate the remarkable increase in the exports: 1901, 9,072 lb.; 1902, 15,592 lb.; 1903, 41,798 lb.; 1904, 77,212 lb.; half of 1905 (to July 3), 51,520 lb. The highest price paid for Ceylon rubber in the London market was 7s. per lb.

THE GUINEA FOWL.

In a former issue of the *Agricultural News* (Vol. IV, p. 30) an article was published in regard to the Guinea fowl. A recent publication of the U.S. Department of Agriculture (*Farmers' Bulletin* No. 234), 'The Guinea Fowl and its use as Food,' contains useful information as to the value of this bird as food. The following extracts are of interest:—

As the English name implies, the birds are probably natives of the West Coast of Africa, although some authorities urge that they are descended from a variety common in Abyssinia. They were raised as table birds by the ancient Greeks and Romans, but disappeared from Europe during the dark ages, and were re-introduced later, it is said, from Jamaica and Cuba. They were evidently taken to the West Indies by the early European settlers and have been abundant in several of the islands ever since. In Jamaica, in some of the Lesser Antilles, and also in the Cape Verde Islands they have gone back to their wild state and are hunted in their season as game birds. They are also well known as game birds in England, where large flocks are sometimes kept in game preserves.

From this discussion it seems that Guinea fowl might well be bred in the United States more extensively than is yet the case, either along with other poultry or in larger numbers by themselves. The varieties have been improved in recent years, and there is reason to believe that the improvement will continue and breeding them will become an increasingly important branch of the poultry industry. The birds do well with comparatively little care, and require comparatively little food in addition to what they will gather if allowed to range. In spite of the half-wild habits which they retain when allowed to range, they may be trained to more domestic ways, and may be readily fed and fattened like other poultry. Even when very young they are exceptionally hardy and free from disease. Although noisy and quarrelsome, these habits have their use, as they are commonly thought to give warning of hawks or other intruders in the poultry yard. Guinea birds eat such large numbers of insects that they are often useful in helping to destroy these pests. They also eat many wild seeds and in this way are of value.

There is already a fair demand for Guinea fowl, especially in New York and other cities in the eastern United States. If, as seems probable, the demand for Guinea fowl as a substitute for game or other poultry continues to increase, the birds ought to become a source of considerable profit to poultry raisers. Very young birds for broilers bring good prices early in the season in city markets, while the older ones are easily sold throughout the autumn and winter. They may be prepared for the table like ordinary fowl or like game birds.

They have very much the same food value as chicken and are as economical when bought at about the same price per pound. At moderate prices they furnish the body with about as much nourishment for a given sum as medium cuts of beef and mutton, and at higher prices correspond in value with the more expensive cuts and such poultry as turkey, green goose, etc. While they can hardly be recommended for families that have to make every penny count, they might well be more extensively eaten by the moderately well-to-do, and would furnish a most acceptable variety. Guinea eggs also are considered very choice eating, and, while they are much like hens' eggs in food value, they have a very delicate flavour, and make a welcome change when obtainable.

ANTHRAX IN GREAT BRITAIN.

The following extract from the *Journal of the Royal Agricultural Society*, England, 1905, contains particulars as to the occurrence of anthrax in Great Britain and discusses further the use of serum as a preventive against the spread of anthrax. It indicates the circumstances under which the use of serum is preferable to that of vaccine.—

The following table shows the incidence of this disease in Great Britain during the past five years:—

Year.	Outbreaks.	Animals attacked.
1901	651	971
1902	678	1,032
1903	767	1,143
1904	1,023	1,533
1905	967	1,333

The figures for the past year are satisfactory in the sense that they show a slight decrease as compared with those for 1904, but they are disappointing in so far as they indicate that the present methods of dealing with the disease are powerless to reduce the number of outbreaks. The probable explanation of this failure has been dealt with in the Annual Report for the two previous years. The measures enforced against anthrax have proved inadequate because a large proportion of the outbreaks have no connexion with antecedent cases on the same farm or premises, but are caused by the use of contaminated cake, meal, and other articles of diet imported from countries in which anthrax is much more prevalent than it is in Great Britain. The provisions of the Anthrax Order, insisting on prompt notification of the disease and proper treatment of the carcasses of animals that have died from it, are admirable as means for preventing the spread of infection where the disease has broken out, and from that point of view they are in most cases quite effectual, as is proved by the fact that in the great majority of outbreaks the losses do not exceed one animal. There are, however, no practicable measures by which the seeds of future outbreaks, in the shape of infected foreign food materials, can be prevented from entering the country, and there is therefore no reason to expect that there will be any sensible decline in the number of outbreaks in the future.

The fact that the number of animals attacked in outbreaks of anthrax in this country is usually very small (less than two on an average) to a large extent deprives of their importance the methods of protective inoculation which have been utilized on a large scale in some foreign countries, for when a farmer has every reason to believe that an outbreak is at an end with the loss of the first animal, he cannot be expected to submit the rest of his stock to an operation which involves some expense and trouble, and is itself not altogether free from risk, nevertheless it appears to be desirable to call attention here to a new method of vaccinating cattle and other farm animals against anthrax, which has some distinct advantages over the one devised by the late M. Pasteur and almost exclusively employed hitherto. In the new method the animal which it is desired to protect receives a subcutaneous injection of so-called 'protective serum.' In order to obtain a supply of this serum an animal (preferably a horse) is first vaccinated with an attenuated or weakened culture of the anthrax bacillus, and after that it

has injected into its body, at intervals, gradually increasing quantities of a virulent culture of the same organism.

After some months of this treatment the blood-serum of the horse acquires protective properties, that is to say, if even a small quantity of it be injected into an ox or other animal the latter is for a time rendered immune against anthrax. The chief advantages of this method of vaccinating against anthrax are (1) that the operation is practically devoid of danger, and (2) that the animal enters into possession of immunity immediately. Its chief defect is that the protection which it confers does not last more than a fortnight, and to this has to be added the fact that the serum is rather more expensive than the 'vaccins,' which are used in the ordinary Pasteurian method of vaccinating. The new method, in spite of these drawbacks, may be recommended as a means of cutting short outbreaks, where, from carelessness in dealing with the carcass of a first case of anthrax, or from any other cause, there is reason to fear that a number of the survivors have already become infected, although they have not yet developed any symptoms of the disease. Furthermore, experience which has been gained abroad indicates that the life of an animal already showing symptoms may sometimes be saved by giving one or more large doses of the serum.

DEPARTMENT NEWS.

With the approval of the Right Honourable the Secretary of State for the Colonies the Imperial Commissioner of Agriculture will proceed to the United Kingdom on duty leave on June 5 next.

The Imperial Commissioner of Agriculture returned from an official visit to the Leeward Islands in S.S. 'Parima' on Tuesday, May 1. During his tour the Hon. Sir Daniel Morris spent several days as the guest of his Excellency Sir Bickham Sweet-Escott at Antigua and addressed a large meeting of cotton growers there on April 24. He also attended a meeting of cotton growers at Montserrat on April 20, and took part in a conference with members of the Agricultural Experiments Committee at Dominica on April 27.

Mr. W. R. Buttenshaw, M.A., B.Sc., Scientific Assistant on the staff of the Imperial Department of Agriculture, returned to Barbados on May 1 in R.M.S. 'Orinoco' and resumed his duties after three months' leave of absence.

Mr. H. A. Ballou, B.Sc., Entomologist on the staff of the Imperial Department of Agriculture, left Barbados for New York in S.S. 'Soldier Prince' on May 9. Mr. Ballou has been granted three months' leave of absence.

Mr. F. A. Stockdale, B.A., Mycologist and Agricultural Lecturer on the staff of the Imperial Department of Agriculture, returned to Barbados in S.S. 'Parima' on May 1 from an official visit of inspection of the Agricultural Schools at St. Lucia and Dominica.

WEST INDIAN PRODUCTS.

Drugs and Spices in the London Market.

The following report on the London drug and spice market for the month of March has been received from Mr. J. R. Jackson, A.L.S.:—

The general condition of the trade in Mincing Lane during the month of March has been quite of a normal character. Jamaica ginger and sarsaparilla have perhaps occupied more attention than any other product. About the middle of the month a substantial rise in price of the former took place, while sarsaparilla has continued very scarce.

GINGER.

At the first auction, on March 7, out of a total of 240 barrels of Jamaica offered, 68 were sold at 57s. to 57s. 6d. for good middling, common realizing 45s. A quantity of Cochin and Calicut was offered, but the sales were small: native cut sold at 70s. to 72s., for bold medium scraped, while medium was bought in at 52s. 6d. to 57s. 6d., small medium at 47s. 6d., and small at 45s. It was reported at this sale that no shipments had yet been received in London of the new season's Jamaica crop, which it was estimated would be very small. At the same period last year about 1,000 packages had already arrived. A fortnight later 100 barrels of Jamaica were offered and disposed of at 65s. for fair clean, and 60s. to 62s. 6d. for middling. Of Cochin, fair bold cut was disposed of at 70s.; medium, 55s. to 55s. 6d.; and fair small, 40s. 6d. to 42s. 6d. At the last sale on the 28th., the following prices were realized: small washed Jamaica, 67s. 6d.; dull washed, 65s.; small to good common, 64s. 6d. Of 166 packages offered nearly 100 were sold. A good business was also done in Cochin and Calicut: out of 400 packages offered 68 were disposed of at rates in advance of previous quotations.

MACE, NUTMEGS, AND PIMENTO.

A quiet tone pervaded the market. At the first spice sale nutmegs were quoted at 1d. lower than at the previous sale, and ordinary mixed black pimento was bought in at 2½d. On the 14th. there were no changes in either of the three spices, while on the 21st. West Indian nutmegs were selling at a reduction of 1d. to 2d. on large sizes, and ½d. to 1d. on medium. Forty-five packages of West Indian mace were sold at from 1s. 4d. to 1s. 5d. for ordinary, 1s. 6d. to 1s. 8d. for fair, 1s. 9d. for good, and 1s. 1d. to 1s. 3d. for pickings. Pimento was bought in at 2⅔d. per lb. No further change in either of the articles took place later.

SARSAPARILLA.

At the first drug sale, on the 8th., the scarcity of this article was still commented upon, and the prospect of new arrivals looked forward to. On the 15th. the market was very firm; 17 bales of grey Jamaica were offered, and practically all were sold; the quality, it was stated, was quite up to the usual standard, the price varying from 1s. 11d. to 2s. 1d. per lb. In consequence of its extreme scarcity, as much as 2s. 3d. per lb. was obtained privately for a few bales. Native Jamaica, which, at the above date, was coming in more freely, sold at steady rates: 20 bales being disposed of at 1s. 1d. for good red to yellow sound, 11d. to 11½d. for fair red, and 9d. for sea-damaged. At the last auction, grey Jamaica was still exceedingly scarce, small sales taking place at 2s. 3d. No Lima-Jamaica was brought forward; and it was stated that no advices were to hand of any likely arrivals.

KOLA, TAMARINDS, AND ANNATTO.

At the auction on the 15th. 10 bags of fair West Indian kola nuts were disposed of at 3½d. In the same week 16s. to 17s. was asked for good Antigua tamarinds. No Barbados were offered, and good West Indian were reported scarce. A week later some good black East Indian were offered and held at 1s. 3d. per cwt. A good supply of Jamaica annatto seed was offered at the last sale, a small quantity only of which sold at 4d. per lb. for fair quality. Good bright Madras was quoted at 5d.

MUSK SEED, OIL OF ORANGE, ORANGE PEEL, AND CHILLIES.

One bag of musk seed from St. Lucia appeared at a sale in the middle of the month and realized 2d. per lb., and at the close of the month West Indian orange oil was offered in large supply, 1 barrel of bitter being sold at 7s. 4d. For good bright Tripoli strip orange peel 7d. was paid; fair quality fetching 6d., and darker 4½d. to 5d. Ordinary dark Zanzibar chillies at the last sale in March were bought in at from 32s. to 35s., while good Nyasaland sold at 39s.; fair at 29s. 6d.; and ordinary at 28s.; 56s. was paid for fine pale Nyasaland capsicums.

Molasses in Canada.

The *Maritime Merchant* has the following note on the Canadian molasses market:—

There is a strong feeling in the molasses market in consequence of the advances and bullish advices from the islands of productions. The cost of Barbados at the present time is fully 1c. per gallon higher than when the new season opened, but still this grade is considerably lower than at this date last year. In Porto Rico molasses the feeling is distinctly firmer on account of the reported decline in the probable supply. Year by year there has been an increase in the number of Centrals grinding, and as these increase, making larger demands upon the cane, the quantity converted into molasses decreases from year to year.

HOGS FOR SMALL FARMERS.

There is one advantage about pigs that make them emphatically the stock for the poor man or the small farmer, and that is the very quick returns which they afford, by the rapidity with which they increase and come to maturity. A good brood-sow, given good treatment, so as to be kept in a good thrifty condition, will farrow two good litters of pigs a year that will run from seven to eight pigs in each litter; and if proper feed and care are given, these may be ready for market by the time they are eight or nine months old at the farthest. No other stock kept on the farm will make so good a return in so short a time. Sheep will come nearest it, but in the same length of time a pig will make double the weight of a lamb.

Another advantage with pigs is that there are marketable from the time they are farrowed until they are fattened for market. A sow with a litter of pigs, and growing pigs, three, four, or five months old, will always sell at full market prices; so that the farmer is not obliged to feed them to maturity to get a little money out of them. With a little management pigs may be fattened to sell in the spring and fall, when it is possible to secure the best gain at the lowest cost; and when it is considered that they utilize much on the farm that would otherwise go to waste, it is only in exceptional cases that at least a few cannot be kept on the farm with profit. (*Midland Farmer.*)

MARKET REPORTS.

London,—April 18, 1906. Messrs. KEARTON, PIPER & Co.; Messrs. E. A. DE PASS & Co.; 'THE WEST INDIA COMMITTEE CIRCULAR'; 'THE LIVERPOOL COTTON ASSOCIATION WEEKLY CIRCULAR,' April 11; and 'THE PUBLIC LEDGER,' April 14, 1906.

ALOES—Barbados, 15/- to 60/-; Curaçoa, 25/6 to 60/- per cwt.
 ARROWROOT—St. Vincent, 2d. per lb.
 BALATA—Sheet, 1/4 to 1/11; block, 1/4 to 1/4½ per lb.
 BEES'-WAX—£7 5s. to £7 12s. per cwt.
 CACAO—Trinidad, 52/- to 60/- per cwt.; Grenada, 47/- to 51/6 per cwt.
 CARDAMOMS—Mysore, 7½d. to 3/- per lb.
 COFFEE—Jamaica, good ordinary, 39/- to 41/- per cwt.
 COTTON—West Indian, medium fine, 6·75d.; West Indian Sea Island, medium fine, 13½d.; fine, 14½d.; extra fine, 16d. per lb.
 FRUIT—
 BANANAS—Jamaica, 5/- to 6/6 per bunch.
 GRAPE FRUIT—14/- to 16/- per box.
 LIMES—4/6 to 5/- per box.
 ORANGES—No quotations.
 FUSTIC—£4 to £4 10s. per ton.
 GINGER—Jamaica, 60/- to 65/- per cwt.
 HONEY—Darkish to good clear, 21/- to 25/- per cwt.
 ISINGLASS—West Indian lump, 1/9 to 2/3; cake, 1/- per lb.
 KOLA NUTS—4d. to 6d. per lb.
 LIME JUICE—Raw, 11d. to 1/2 per gallon; concentrated, £18 10s. per cask of 108 gallons; hand-pressed, 2/3 to 2/6 per lb. Distilled Oil, 1/7 to 1/8 per lb.
 LOGWOOD—£4 to £4 15s.; roots, £3 10s. to £4 per ton.
 MACE—Fair red, 1/4 to 1/5; per lb.
 NITRATE OF SODA—Agricultural, £11 15s. per ton.
 NUTMEGS—82's, 7½d.; 100's, 8d.; 116's, 6d. to 6½d. per lb.
 PIMENTO—Fair, 2½d. to 2½d. per lb.
 RUM—Jamaica, 2/1 per proof gallon; Demerara, no quotations.
 SUGAR—Yellow crystals, 14/- to 15/- per cwt.; Muscovado, 13/- per cwt.; Molasses, 11/- to 15/- per cwt.
 SULPHATE OF AMMONIA—£12 7s. 6d. per ton.

Montreal,—March 19, 1906.—Mr. J. RUSSELL MURRAY.
 (In bond quotations, c. & f.)

COCOA-NUTS—Jamaica, \$26·50 to \$28·50; Trinidad, \$25·00 to \$26·00 per M.
 COFFEE—Jamaica, medium, 10c. to 11c. per lb.
 GINGER—Jamaica, unbleached, 10c. per lb.
 MOLASCUIT—Demerara, \$1·00 per 100 lb.
 MOLASSES—Barbados, 27c. to 28c.; Antigua, 23c. per Imperial gallon.
 NUTMEGS—Grenada, 110's, 18c. per lb.
 ORANGES—No quotations.
 PIMENTO—Jamaica, 5½c. per lb.
 SUGAR—Grey crystals, 96°, \$2·10 to \$2·20 per 100 lb.
 —Muscovados, 89°, \$1·60 to \$1·75 per 100 lb.
 —Molasses, 89°, \$1·40 to \$1·50 per 100 lb.
 —Barbados, 89°, \$1·55 to \$1·80 per 100 lb.

New York,—April 13, 1906.—Messrs. GILLESPIE BROS. & Co.

CACAO—Caracas, 11½c. to 12½c.; Grenada, 10c. to 10½c.; Trinidad, 10½c. to 11½c.; Jamaica, 9½c. to 10½c. per lb.
 COCOA-NUTS—Jamaica, \$20·50; Trinidad, \$19·00 to \$20·00 per M.
 COFFEE—Jamaica ordinary, 8½c. to 8½c.; Black River, 8½c. to 8½c. per lb.
 GINGER—Dark scraggy root, 11c. to 12½c.; small white to bright bold, 12½c. to 14½c. per lb.
 GOAT SKINS—Barbados, Dominica, and Antigua, 59c. to 59c.; Jamaica, 61c.; St. Kitt's, 51c. per lb.
 GRAPE FRUIT—Jamaica, \$8·00 to \$12·00 per barrel; \$4·50 to \$6·00 per box.
 MACE—30c. to 35c. per lb.
 NUTMEGS—West Indian, 80's, 22c.; 90's, 19c.; 100's, 17c.; 110's, 14½c. to 15c. per lb.

ORANGES—Jamaica, \$5·00 to \$6·00 per barrel; \$2·50 to \$3·00 per box.
 PIMENTO—4½c. to 4½c. per lb.
 PINE-APPLES—No quotations.
 SUGAR—Centrifugals, 96°, 4·48c.; Muscovados, 89°, 3c.; Molasses, 89°, 2·75c. per lb.

INTER-COLONIAL MARKETS.

Antigua,—April 25, 1906.—Messrs. GEO. W. BENNETT BRYSON & Co., LTD.

SUGAR—\$1·45 to \$1·50 per 100 lb.

MOLASSES—18c. per gallon.

Barbados,—April 30, 1906.—Messrs. T. S. GARRAWAY & Co., and Messrs. JAMES A. LYNCH & Co., April 14, 1906.

ARROWROOT—St. Vincent, \$4·00 to \$4·25 per 100 lb.

CACAO—\$11·50 per 100 lb.

COCOA-NUTS—\$10·00 per M. for husked nuts.

COFFEE—\$10·00 to \$11·75 per 100 lb.

HAY—\$1·20 per 100 lb.

MANURES—Nitrate of soda, \$65·00; Ohlendorff's dissolved guano, \$55·00; Cotton manure, \$48·00; Sulphate of ammonia, \$75·00; Sulphate of potash, \$67·00 per ton.

MOLASSES—Muscovado, 16c.; fancy, 17c. per gallon.

ONIONS—\$6·00 per 100 lb.

POTATOS, ENGLISH—Nova Scotia, \$2·00 to \$2·25 per 160 lb.

RICE—Ballam, \$5·40 per bag (190 lb.); Patna, \$3·30; Rangoon, \$2·65 to \$2·75 per 100 lb.

SUGAR—Muscovados, 89°, \$1·45; dark crystals, 96°, \$1·90 per 100 lb.

British Guiana,—April 26, 1906.—Messrs. WIETING & RICHTER.

ARROWROOT—St. Vincent, \$8·00 per barrel.

BALATA—Venezuela block, 25c.; Demerara sheet, 38c. per lb.

CACAO—Native, 13c. to 14c. per lb.

CASSAVA STARCH—\$4·00 per barrel.

COCOA-NUTS—\$10·00 to \$12·00 per M.

COFFEE—14c. to 15c. per lb.

DHAL—\$5·50 per bag of 168 lb.

EDDOES—88c. to \$1·20 per barrel.

MOLASSES—14½c. to 15c. per gallon.

ONIONS—Lisbon, 6c. per lb. (ex store).

PLANTAINS—12c. to 24c. per bunch.

POTATOS, ENGLISH—\$2·00 to \$2·25 per barrel.

POTATOS, SWEET—Barbados, \$1·92 per bag.

RICE—Ballam, \$4·90 to \$5·00 per 177 lb.; Creole, \$4·00 per bag (ex store).

SPLIT PEAS—\$5·80 to \$5·85 per bag (210 lb.).

TANNIAS—\$1·56 per barrel.

YAMS—White, \$2·16; Buck, \$3·00 per bag.

SUGAR—Dark crystals, \$2·00 to \$2·10; Yellow, \$2·40 to \$2·50; White, \$3·50 to \$3·60; Molasses, \$1·80 to \$1·90 per 100 lb. (retail).

TIMBER—Greenheart, 32c. to 55c. per cubic foot.

WALLABA SHINGLES—\$3·00, \$3·75, and \$5·25 per M.

Trinidad,—April 12, 1906.—Messrs. GORDON, GRANT & Co.; and Messrs. EDGAR TRIPP & Co., April 27, 1906.

CACAO—Ordinary to good red, \$11·00 to \$11·25; estates, \$11·50 to \$11·90 per fanega (110 lb.); Venezuelan, \$11·75 to \$12·50 per fanega.

COCOA-NUTS—\$20·00 per M., f.o.b.

COCOA-NUT OIL—65c. per Imperial gallon (casks included).

COPRA—\$3·10 to \$3·25 per 100 lb.

DHAL—\$5·00 to \$5·50 per 2-bushel bag.

MOLASSES—18c. per gallon.

ONIONS—\$3·00 per 100 lb. (retail).

POTATOS, ENGLISH—\$1·20 to \$1·40 per 100 lb.

RICE—Yellow, \$4·60 to \$5·25; White, \$4·90 to \$5·75 per bag.

SPLIT PEAS—\$4·90 to \$5·15 per bag.

SUGAR—Yellow crystals, \$2·10 to \$2·25; molasses, \$2·00 per 100 lb.



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of the numberless new uses to which rubber is being put, and the consequent steady increase in its value, it is probable that rubber planting would prove a profitable industry in some parts of the West Indies. The *Castilloa* or Central American rubber tree (*Castilloa elastica*) is the tree which is most likely to suit the conditions existing in these islands.

An interesting discussion took place at the last West Indian Agricultural Conference as a result of the reading of a paper, prepared by Captain M. Short, on *Castilloa* Rubber in Tobago. A particular feature of this discussion was the suggestion that the *Castilloa* might be usefully employed as a shade tree in cacao plantations. Captain Short stated: 'There is little doubt that the return per acre would be greater from a plantation of cacao and *Castilloa* than from cacao shaded by *Bois Immortel*.' Prominence has been given in the *Agricultural News* to this aspect of the question. On page 219 of the last volume an article was published describing cacao cultivation in Venezuela, in which special attention was drawn to the possibility of carrying on rubber planting as an adjunct to cacao cultivation by using *Castilloa* trees for shading the cacao. Reference was made to an experiment carried out by General Fonseca in the Ocumare Valley, which 'is specially remarkable, as it shows that the *Castilloa* can be grown among cacao trees without in any way harming their production. Indeed, at Ocumare they have noticed no diminution in the number of pods carried by the trees shaded by *Castilloa*, nor any change in the quality of the bean.' The experience of a planter in Ceylon also 'supports the contention that these two products may be grown together.'

Prospects for Rubber Planting in the West Indies.

FOR some time past the Imperial Department of Agriculture has been advocating the planting of rubber trees in suitable localities in certain of the West India Islands. In view

In the paper by Captain Short, referred to above, it is estimated that the return from an acre of cacao and rubber would be £4 to £6 more than that from an acre of cacao shaded by Bois Immortel.

It is not recommended that rubber trees should be planted amongst old and established cacao trees, when the latter cover the ground and do not require overhanging shade. It is not likely that Castilloa trees planted under such conditions would thrive. On the other hand, for the purpose of giving side shade and shelter, rubber trees might usefully be planted along the sides of the cacao fields. Also, they might be planted with young cacao, as is being done in Tobago. By this method the planter would be likely to obtain some return from the cacao in four or five years, whereas rubber trees planted alone could not be expected to yield any return in less than seven to nine or even ten years.

There is no doubt that Trinidad, Tobago, St. Lucia, Dominica, and Jamaica are well adapted to the cultivation of rubber trees, also large tracts of land in British Guiana. In Tobago, this new industry is full of promise. Some 100,000 Castilloa trees of all ages are established, and good prices have been obtained for rubber exported from the island. Efforts are also being made to encourage the planting of Castilloa trees in suitable spots in St. Kitt's, Nevis, and Montserrat. As has already been stated in the *Agricultural News*, it may be taken as a general guide that the Castilloa will do well wherever cacao grows.

At the present juncture, when rubber planting is attracting so much attention all over the world, special interest attaches to the papers on experiments with rubber-yielding plants in Dominica and St. Lucia, published in the last issue of the *West Indian Bulletin*. Mr. Joseph Jones, Curator of the Botanic Station at Dominica, states that the Castilloa thrives excellently in that island and is likely to give satisfactory yields. Further: 'Cacao trees growing near to Castilloa at the Botanic Station for the last twelve years have borne as well, and look as healthy, as cacao growing outside the area occupied by the Castilloa roots.'

As regards St. Lucia, Mr. J. C. Moore, the Agricultural Superintendent, points out that all the conditions of climate and soil required by the Castilloa are to be found there, and 'the result of local experiments in the cultivation and tapping of these trees appears to afford ample evidence of the success that is likely to attend their extended cultivation in this island.' Mr. Moore suggests that the best time to

plant rubber trees in St. Lucia would be between June and November.

These papers contain detailed information with regard to the operations connected with the tapping of the trees and the preparation of the rubber for market and, read in conjunction with a previous article in the *West Indian Bulletin* (Vol. V, pp. 210-23) on the same subject, should be of considerable service to planters in the conduct of similar experiments.

Judging by the returns showing the number of rubber plants distributed from the various Botanic Stations in the West Indies during the past few years, it would appear that considerable attention is being paid to this subject, and as these trees arrive at the proper age for tapping it should be possible to obtain still more authentic information as regards the possibility of carrying on the industry on an extensive and profitable scale.



SUGAR INDUSTRY.

Raising Seedling Sugar-canes in Cuba.

Increased attention is now being paid throughout cane-growing countries towards the possibility of raising improved varieties of sugar-cane by hybridization. The area under seedling canes is gradually extending, and it is hoped that breeding continually for a cane of greater vigour and hardiness, giving a larger yield of sugar per acre, will be the means of improving the prospects of the cane sugar industry. The following extract is taken from a report from Mr. E. F. Atkins, Harvard Experiment Station, Cienfuegos, Cuba, and shows that, owing to a favourable season, excellent results have been obtained from the hybridization experiments carried on during the last season:—

Four years of careful hybridization resulted in but two seedlings, and it is gratifying to note that, owing to a favourable season, with intervals of warm weather of sufficient duration to permit fertilization of the flowers and ripening of the seeds, our efforts have proved successful. With the aid of the greenhouse to ward off severe cold spells during germination, we have this year raised over 600 seedlings, nearly all the result of hand fertilization.

Hand fertilizing was carried on daily from the earliest flower opening in November until the middle of April, the close of the flowering period, often without success, as several sudden cold waves destroyed quantities of the seeds before the ripening period.

Those which succeeded in escaping severe cold weather for thirty or thirty-five days were then collected and sown in the greenhouse, where they could be protected from the cold,

and the pots and boxes were placed over pans of water further to protect them from being destroyed or carried off by ants and other insects.

As a test to their germinating power in various soils, seeds were sown in red iron-clay soils; black humus mixed with fine clay; decayed leaf mould and sand; equal parts of garden soil and sand; pure sand; paper blotters, etc. The best results were obtained from the mixture of black humus soil and clay. The seeds germinated freely in it and continued to grow nicely without the necessity of transplanting until large enough to stand moving without injury, and the soil remained moist and friable for a long period.

The leaf humus proved first rate, and the seeds germinated freely in it, but it dried out very quickly being too porous, and when kept wet, algae formed on the surface which proved destructive, and the plants had to be transferred to a more solid mixture when very tiny. Leaf soil when decomposing produced detrimental fungi. Clean sand proved satisfactory as a germinating medium but slow, and the seedlings grew very weakly. Great care had to be taken in watering to keep the young plants from 'damping off' in dull weather. Results in red clay soil were poor, as the soil baked and became hard in drying off, and if kept wet the seeds decayed. The other soil experiments and blotters proved failures. In all cases the seeds were sown thickly and covered lightly, samples buried deep (less than $\frac{1}{2}$ inch) died.

I have found great care essential in watering, especially seeds of 'Crystallina' and 'Cinta,' which proved very delicate under all conditions. The best results were from soil kept continually moist.

Quantities of seeds were sown in the open ground in prepared beds, but without success. I have searched over a great deal of territory in the fields in various soils and under all conditions but have failed to locate a single seedling of spontaneous origin.

Many interesting points are set forth in this report, especially those relating to the experiments in different kinds of soils, and they go to show how much care must be taken to obtain the successful germination of sugar-cane seeds.

Cultivation of the Sugar Beet in England.

Mr. J. R. Jackson, A.L.S., has forwarded the following notes on the experimental cultivation of beet-root for sugar in England, which are likely to be of interest in the West Indies:—

The subject of the cultivation of beet-root for sugar-making purposes in England, though by no means new, has been attracting a considerable amount of attention during the past month, and as it is a question that would greatly affect the West Indian sugar-cane cultivation, a *résumé* of the several points that have been brought forward in the London press and in the House of Lords will probably be of interest to the readers of the *Agricultural News*.

It is conceded by all those who have written or spoken on the subject that there is no question with regard to the possibility of successfully growing beet in England, and a writer in the London *Daily Telegraph* follows this up with the remark that 'it is certainly anomalous that while the United Kingdom is the largest consumer of sugar in the world, and the beet crop can be successfully grown, not an ounce of the commodity is produced here, while in Germany many acres are profitably employed, and work given to thousands of people in order to supply us with one-half of the quantity we require. No doubt a chief cause was to be

found in the existence of stimulating bounties, which resulted in that country and Austria securing the bulk of the trade. It is the removal of these bounties under the operation of the International Convention signed at Brussels in 1902 that has led to the revival of the question in the most promising aspect it has yet assumed, and which, it is sincerely hoped, may result in a most desirable addition to the industries of the country.

'In the successful establishment of a home sugar industry it is unquestionable that great advantages would accrue to the whole community. In the first place, it would make a most important addition to the crops that might be remuneratively grown in Great Britain and Ireland, ensuring the profitable employment of many acres of land that are now lying useless; occupation would be found for many more labourers on the land, and the beet factories would engage a large number of hands. The country would derive further benefit by the increased production of sugar, and would not be so dependent on the foreigner for a necessary article of food.'

The writer of the article, from which the above is an extract, then proceeds to review the effects of a surtax and excise duties on British produce, and concludes as follows:—

'The cost of producing an acre of beet is usually put at £10. Under favourable circumstances the average crop is 12 tons per acre, and in Germany 18s. 6d. is the average price paid for beet per ton delivered at the factory. Mr. Mason (previously referred to as an authority on the subject) puts the figures thus: Cultivation per acre and delivery to the factory, £9 18s.; beet sold to factory, 12 tons at 18s. 6d., £11 2s.; tops, 4 tons at 3s. 12s.; total, £11 14s., leaving a profit of £1 16s. Mr. S. Stein, an expert in sugar manufacture, gives a much more favourable result. Mr. W. C. Brown (also referred to as an expert) states that the conditions of Germany for growing beet are the same as here, only the Germans have the factories and we have not. At present prices even they will not be able to make much or any profit. Of course the former can, and do, put a duty of 2s. 6d. per cwt. against us, besides the internal duty of 7s.'

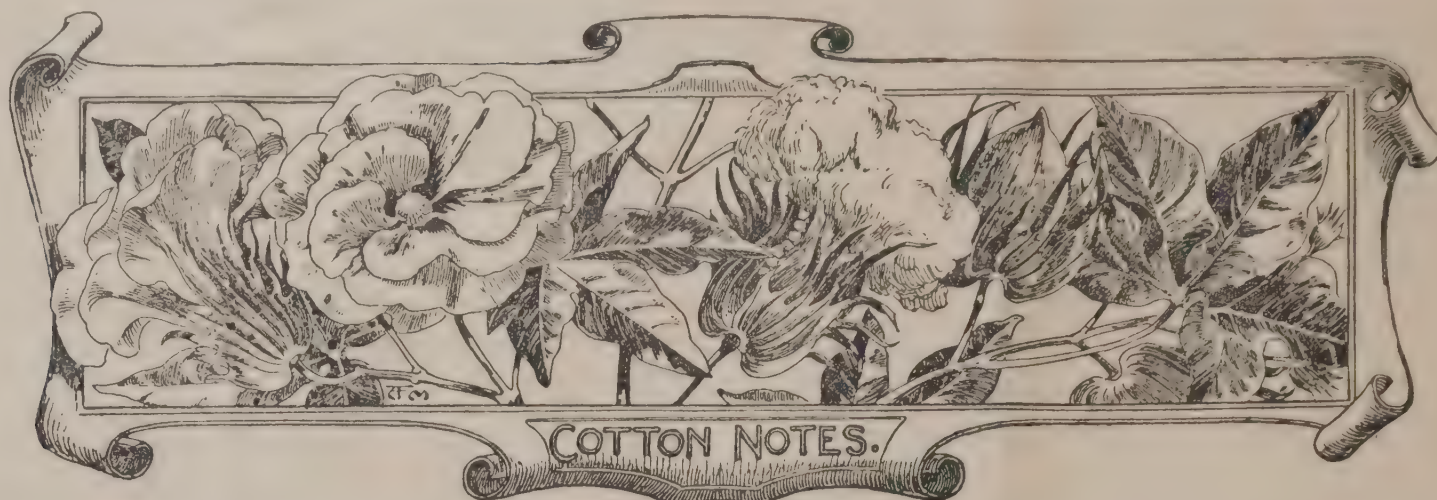
It will be observed that no reference whatever is made by the writer of this article to the close connexion of the British West Indian product from the sugar-cane with that of the beet, nor to the efforts of the Imperial Department of Agriculture in perfecting the cane cultivation.

THE IMPERIAL DEPARTMENT OF AGRICULTURE AND ST. VINCENT.

The following is a copy of a resolution unanimously passed at a general meeting of the St. Vincent Cotton Growers' Association and Agricultural and Commercial Society, held at the Court House on Wednesday, May 2, 1906:—

Resolved.—That this Association and Society gratefully records its appreciation of the great work which has been, and is being done, in the West Indies by the Imperial Department of Agriculture, and the signal success that has attended it in this colony—prominently exemplified by this island's cotton having taken the premier place in quality.

That the members of this Association and Society believing that the continued success and further improvement and extension of the cotton industry and agriculture generally in this colony depend on the continuance of this work, His Majesty's Government be respectfully asked to maintain the Imperial Department of Agriculture for the West Indies.



CONFERENCE OF COTTON GROWERS AT BARBADOS.

At a conference of cotton growers held at the Carnegie Library on Friday, May 4, under the auspices of the Agricultural Society, the Hon. F. J. Clarke, M.C.P., President, in the chair, the Imperial Commissioner of Agriculture delivered the following address:—

This is the sixth conference held in Barbados with the view of taking stock of the situation and discussing with the growers the steps desirable to be taken still further to extend and improve the industry. The first conference was held on February 6, 1903; the second, after my return from a visit to the Sea Islands, December 12, 1903. In October 1904 was held an important conference at which Mr. E. Lomas Oliver was present as a deputation from the British Cotton-growing Association. Later conferences were held on April 14, and in the parish of St. Philip on June 24, 1905.

PROSPECTS OF THE INDUSTRY.

There can be no doubt as to the steady progress made by the cotton industry in the West Indies during the last three years. During 1905 the value of the cotton lint and seed produced in the whole of the West Indies amounted to £63,000. Barbados produced a little more than one-third of this, namely, cotton lint and seed of the value of £23,000.

In regard to prices, Barbados has maintained a good position. During 1905 the highest prices ranged from 15*d.* to 16½*d.* per lb. On the other hand, for the crop now being shipped (1906), the highest prices have ranged from 15½*d.* to 18*d.* per lb. There is every indication that if cotton growers will devote close and constant attention to the industry and maintain a high quality of lint, the prices will continue to be remunerative even if they are not so high as at present.

The following table illustrates the progress made in cotton cultivation at Barbados:—

Statement showing the area under Cotton, and the quality and value exported for the years 1902-5 (inclusive).

Year.	Acreage under cultivation.	Crop, lb. (Following year.)	Value of Cotton Lint and Seed.
1902	16	5,550	£ 318
1903	800	192,061	£10,968
1904	1,647	344,232	£22,530
1905	2,000	500,000 (Estimated.)	£28,552 (Estimated.)

It is probable, according to present indications, that the area to be planted this autumn will be about 4,000 acres,

yielding a possible crop of the value, for lint and seed, of £50,000 to £60,000.

PROSPECTS OF SEA ISLAND COTTON.

In considering the future of a Sea Island cotton industry in the West Indies, the following information may be of interest: (a) The area under cultivation in Sea Island cotton in the Sea Islands has not appreciably increased of late years. (b) The use of Sea Island cotton is steadily extending in the United States, in the United Kingdom, and on the continent of Europe. Recently, French buyers are increasing the use of West Indian Sea Island cotton. (c) No other country has, as yet, been successful in establishing a Sea Island cotton industry. Probably all conditions necessary are not found anywhere to such a high degree as in the West Indies. (d) As showing there is still considerable room for expansion in the West Indies, the British Cotton-growing Association stated in 1904 that it might be possible to produce up to 20,000 or 30,000 bales without appreciably disturbing the market. In 1905, the West Indies produced 4,000 bales only; in 1906 they are likely to produce about 7,000 bales. Probably, in 1907, the West Indies will not produce more than about 10,000 to 12,000 bales. In any event, it may be safe to assume that prices are not likely to fall below 1*s.* per lb. If cotton growers would frame their estimates on this basis, the prospects of the industry would be as favourable as any in this part of the world.

It might be useful to add that the cotton spinners in the United States retained for their own use 60,000 bales of Sea Island cotton in 1905, and 76,000 bales in 1906. It is not improbable that the fine spinners in the United States will eventually take the whole of the cotton produced in the Sea Islands. This would lead to the cotton spinners in European countries having to depend entirely on the Sea Island cotton produced in the West Indies.

REQUIREMENTS OF THE INDUSTRY.

It is not necessary for me to enter into great detail in regard to this part of the subject, as full information for the guidance of those embarking in the industry is available in the *A.B.C. of Cotton Planting* published by the Imperial Department of Agriculture. It should, however, be borne in mind, that a good crop of first-class cotton cannot be raised on poor, shallow soils, and especially in localities exposed to strong winds. There should be thorough preparation of the land some time before the seed is planted. The manure also should be put in early, and only the best seed should be used. The small extra expense incurred in buying the best selected and disinfected seed bears no comparison to the extra price that would be obtained for the lint.

The time when to plant is still a difficult problem to solve, owing to the varying conditions existing in each locality. Speaking generally, planting in July and August has probably given the best results. Planting later than September has usually proved unsatisfactory. It is desirable that great stress should be laid on the fact that, wherever possible, all old cotton should be taken up and burnt before the new crop is started. This is the only way in which the various diseases attacking cotton, including the cotton worm, mildew, and other pests, can be kept under complete control. Prevention is better than cure. The experience of the officers of the Department is that a greater loss is incurred by allowing old cotton plants to remain on the land and infect the new crop than by any other means. Further, it is to be remembered that the Sea Island cotton plant, as we now know it, has for more than fifty years been treated as an *annual*. We should, therefore, continue to treat it as such, especially in the tropics where there is no winter to keep pests in check.

As regards the prompt treatment of the cotton worm, the use of Paris green, when taken in time, is effectual. A supply of Paris green should be secured even before the seed. A new blower for applying Paris green to cotton plants has recently been generally adopted in the Sea Islands. This blower is described with an illustration on p. 154 of the last issue of the *Agricultural News*.

Complaints have lately been received from the British Cotton-growing Association in regard to cotton that has been picked when not fully ripe and in a damp condition. Such cotton has been reported as 'gin-cut' and full of 'nep.' It is most important that cotton should only be picked when fully ripe and that it be carefully sunned before it is sent to the gin.

As regards ginning and baling, the growers in Barbados are provided with the means of having their cotton ginned and baled at a lower cost than anywhere in the Sea Islands.

Those who propose to take up cotton planting for the first time should be strongly advised to provide adequate supervision in order that the cultivation and the treatment of the plants may result in good crops. In some of the other islands it is proposed that one man should be placed in exclusive charge of every 50 acres planted in cotton. This would be a wise precaution to adopt also in Barbados.

TREATMENT OF THE COTTON WORM.

The attacks of the cotton worm are probably the most troublesome of any to the cotton planter. The experience of those who have taken a leading part in the industry is that, if taken in time, the cotton worm can be effectually kept in check by the use of Paris green.

Too often the worm is not detected until considerable injury has already been done, and then Paris green is applied in such large quantities as seriously to diminish any profits that may be reaped.

It is suggested that a reward be offered to the watchman or any other persons on the estate in order to encourage them to report the first appearance of the worm. It is not absolutely necessary to use lime. Possibly, with the new blower, Paris green may be applied alone. Hitherto, Paris green and lime have been applied in the proportion of 1 lb. of Paris green to 6 lb. of lime. This is equivalent to 1 part of Paris green to 12 parts of lime by measure.

The indications are that Paris green will be dearer during the coming season, and, on that account, every effort should be made to economize its use. It is also recommended to make purchases of Paris green at once in order that no difficulty may be experienced in obtaining an adequate supply later in the season.

AWARDS OF GOLD MEDALS.

Sir Alfred Jones, the President of the British Cotton-growing Association has been good enough to offer gold and silver medals for competition amongst the growers of cotton in the West Indies. The two silver medals have already been awarded in this island.

In regard to the competition for the two gold medals, arrangements have been made for these to be awarded for cotton grown during this year (1906), upon the following conditions:—

(1) The cotton must be, in every case, shipped by bona fide cotton growers either to the British Cotton-growing Association (Manchester), or to Messrs. Wolstenholme & Holland (Liverpool).

(2) The awards will be based on crop results and not on individual samples.

(3) Competitors should furnish particulars at the end of the crop as follows:—

- (a) Area planted with cotton and no other crop.
- (b) Actual weight of cotton shipped for crop 1906.
- (c) Prices obtained per pound for all grades of cotton grown in the area given under (a).

It is suggested that competitors should send in the particulars required to Mr. J. R. Bovell, F.L.S., F.C.S., Public Buildings, Bridgetown, not later than November 30, 1906.

At the adjourned meeting on May 11, Mr. J. R. Bovell, F.L.S., F.C.S., read the following paper:—

Sir Daniel Morris has asked me to prepare a few notes with reference to the cultivation, etc., of cotton, more for the benefit of those planters who have not yet undertaken cotton growing, than with the intention of trying to teach those who have been growing cotton from the first.

PREPARATION OF LAND FOR COTTON GROWING.

With regard to the preparation of land for cotton growing, it is impossible to lay down hard-and-fast rules to suit all the districts of the island and all the conditions existing on estates, as the character of the soil differs so much in various parts of the island. For instance, the thin soils in the Black Rock districts would require less tillage than the heavy lands in certain parts of St. George and St. Philip. What would be ample tillage for land in the Black Rock districts would not be enough for the heavy lands referred to above. Land from which ratoon canes had been cut would have to be differently treated from land that had grown, say, sweet potatoes or yams, as the digging out of the vegetables supplies, to some extent, the necessary tillage. Furthermore, land under ordinary estate conditions, on which a crop has not been grown for some time, but which has been kept free of weeds, would not require as much tillage as, say, a field from which ratoon canes had just been reaped. I know of an instance this year where land has been prepared for sweet potatoes since last December, but, owing to the drought experienced for the last five months, they have not been planted, and the owner of the estate proposes to plant cotton as soon as the rains come in. Now, certainly, this land would not require the tillage necessary for land in which ratoon canes had been grown; in addition, the cracks in the fields caused by the drought are equivalent to a certain amount of tillage. What is essential is that the land should be sufficiently tilled to allow the roots of the plants to penetrate easily in all directions, and then hoed over to reduce it to a fine tilth.

CONFERENCE OF COTTON GROWERS AT BARBADOS.

(CONTINUED.)

MANURES.

The next thing I think we may consider is the manuring of cotton. Where farmyard manure is to be used, it should be applied sufficiently long before the cotton is to be planted to allow of the soil assimilating it. If this is not done, there is not time for its constituents to be taken up by the cotton plant during its life when treated as an annual, and therefore the cotton is not sufficiently benefited by the application of the manure. The same thing may be said of sheep manure. I may here mention that in the States it is found that farmyard and other organic manures are of more use as renovators of the soil than as actual cotton manures. With regard to chemical manure, this should be applied just after the cotton grows; or, if it is preferred, the phosphates and potash may be applied before the land is planted, and then as soon as the cotton is from 6 to 8 inches high, the nitrate of soda or sulphate of ammonia may be sprinkled round the plantlets and mixed with the surface of the soil. The application of chemical manure at present recommended by the Imperial Department of Agriculture is at the rate per acre of 300 lb. of superphosphate of lime, 40 lb. of sulphate of potash, and 100 lb. of sulphate of ammonia, or 125 lb. of nitrate of soda. At first it was stated in the *A.B.C. of Cotton Planting* that 400 lb. of superphosphate of lime was required, but it has since been found that 300 lb. is nearer the right quantity. In several instances this year this manure has been found satisfactory, and one gentleman who applied to me for information with regard to growing his cotton, tells me that he carried out the advice I gave him, planted his cotton 5 feet apart and 20 inches apart in the rows, applied 300 lb. of superphosphate, 40 lb. sulphate of potash, and 100 lb. sulphate of ammonia, and he got nearly 1,500 lb. of seed-cotton per acre, and netted about \$78.00. The cost of this manure was a little less than \$7.00 per acre.

DISTANCE TO PLANT COTTON.

Now as to the question of the distance between the rows and the individual plants in the rows, there again no hard-and-fast rules can be laid down. Where the land is rich and the plants grow large, they should be planted wider apart than where the soil is poor and the plants do not grow so large. If the trees are planted in rich soil too close together, the branches interlace and cover the ground, thus excluding the sunshine and air, consequently, before the bolls arrive at maturity they drop. In poor soils, however, where the branches do not spread to such an extent as to exclude the sunshine and air, and the plants have room to ripen their bolls properly, the trees may be planted closer. As Sir Daniel Morris told you last Friday, in St. Kitt's excellent results were obtained with cotton planted 5 feet by 4 feet, but this land had been prepared for canes and was well manured. As a rule, however, it has been found in the United States of America that the best results are obtained where the cotton is planted 5 feet apart and 20 inches apart in the rows.

TIME TO PLANT.

As to the question of the right time to plant cotton, I fear we have not yet got sufficient data to make a definite statement. But from what little experience we have had, it would appear that so far as land in St. Philip and about

the same level is concerned, cotton, other than that planted as a catch crop, should be planted about July or August. On the other hand, I believe that cotton in St. John and the higher districts should probably be planted a month or six weeks later, for the reason that the rainfall is greater in the higher districts than in the lowlands, and if the cotton is planted later, it will consequently ripen later, and will not be so likely to be injured by the rain. Of course, where catch-crop cotton is planted, the sooner it is got in after the rainy season commences, the better.

IMPORTANCE OF A REGULAR STAND.

It is very important that a regular stand should be obtained at as early a time as possible, to secure which a sufficient number of seeds should be sown. When Sir Daniel Morris and myself were in the Sea Islands two years ago, we were told that to secure a regular stand practically a small handful of seeds was put in each hole, and as soon as they grew all were pulled up except the two most healthy plants, and then, as soon as these two got about 6 to 8 inches high, the weaker was also pulled up and only the stronger left. At the end of a fortnight any non-growing holes were re-sown. A pound of cotton seed contains, roughly speaking, 4,000 seeds. Six pounds would therefore contain 24,000 seeds. Land planted in rows 5 feet apart and 20 inches apart in the rows should contain about 5,226 holes to the acre. At least four seeds should be planted in each hole, which would take about 21,000 seeds, and then there would be about 3,000 over to be used for replanting any holes, the seeds of which failed to germinate.

MOULDING UP.

When the plants are about 8 inches high, they should be hilled or moulded up for the first time to prevent their being tossed about by the wind. This should also be done later on, when they are about from 12 to 16 inches high.

WEEDING THE LAND.

The land should be kept free from weeds, which should be regularly hoed up. When, however, the plants get so advanced that the branches are easily struck with the hoe when the weeds are being killed, the latter should be pulled up by hand. If plants are struck by the hoe, it is usually found that the parts injured are attacked by what is known as the 'Red Maggot.' Sufficient care should therefore be taken in weeding to avoid injury to the plants.

DUSTING WITH PARIS GREEN.

I think I need hardly say now that it is absolutely essential that Paris green and lime should be kept ready to be dusted on the plants on the first sign of attack by the cotton caterpillar. This should be kept in the proportion of 1 lb. of Paris green to 6 lb. of lime. If possible, the Paris green should be dusted on the plants early in the morning when the dew is on, as it sticks better than later in the day when the plants are dry. In fact, in the States it is sometimes dusted on the plants at night after the dew has commenced, but I do not know how this would answer in Barbados. Cotton growers should clearly understand that it is the arsenic in the Paris green that kills the caterpillars, and not the lime. I have known instances where planters, who have run out of Paris green, have dusted the attacked plants with lime only, imagining that that would be sufficient.

PICKING COTTON.

The next thing that we may consider is the picking of cotton. The pickers should be provided with a bag 2 feet long by 18 inches wide, hung over their shoulders, to leave both hands free. If this is done, the picker has both his hands free, one for taking hold of the boll and the other for extracting the cotton. Again, any bits of broken leaves, etc., that get attached to the cotton may be removed with one hand before the cotton is put in the bag: if this is not done and the cotton is put in the bag, the bits of leaf, etc., get pressed into the cotton, and are very difficult to remove, the labourers sometimes breaking the fibres in taking out the bits of leaf. The bag should have attached a large pocket about half its size, i.e., about 1 foot by 18 inches. In the bag should be put all good ripe cotton, and into the pocket any cotton that is not of the first quality, i.e., cotton that has been soiled by mildew, etc., cotton to which bits of leaf are adhering, as it is essential that the best cotton should be shipped by itself. In extracting the cotton from the bolls the labourers should be taught to take it out with one pull. If two pulls have to be made, practically only about half as much cotton will be picked per day as would be picked if the cotton were extracted in one operation. Cotton should not be picked from bolls that are not fully open, and on no account should the pickers be allowed to force open the bolls in extracting cotton.

There is one other point, and that is that the cotton should be sunned after it is picked. As Sir Daniel Morris will tell you, wherever we went in the States we saw them drying cotton, and in every case we were told that it was necessary to do so. Lately, the Superintendent of Agriculture for the British West African Colonies and Protectorates, who has just issued a report on his visit to the United States in connexion with cotton growing, also mentions the fact that Sea Island cotton is exposed to the sun for some time.

At the beginning of the season cotton was sent damp to the factory by more than one grower. In each case the planter was told about the mistake he was making by not sunning his cotton before it was sent in. Messrs. Wolstenholme & Holland, the brokers, not knowing that we had detected that the cotton was not sufficiently sunned, returned me a sample to see, and on my writing to tell them that I had at the time pointed out to the planter the mistake he was making in not sunning his cotton, they wrote very strongly on the subject, saying, 'We are sorry to hear that some of the cotton has been insufficiently sunned . . . This is *fatal* as it produces the appearance which is commercially termed neppy and gin cut.' Also: 'The picking from unopened bolls should be severely *stamped out at once*, for unripe fibre must be weak, and weak long-staple cotton is almost unsaleable.'

A very suitable drier for sunning cotton is a rectangular frame 10 feet long by 6 feet wide, of boards 4 inches wide by 1 inch thick. To the bottom of this should be nailed $\frac{1}{2}$ inch galvanized-iron netting. These driers should be laid on horses in the sunshine, and at the first appearance of rain they should be carried into the cotton house, and packed on top of one another.

CUT WORM.

There is one other insect pest of cotton which has been causing growers some trouble lately, and that is the 'cut worm.' It can be easily controlled by the application of a mixture of 1 lb. of Paris green and 50 lb. of pollard, moistened with molasses and water.

The cut worm not only attacks cotton but also young corn, and other plantlets, and the Paris green and pollard have been found efficacious in destroying it.

ROTATION OF CROPS.

With regard to the rotation of crops with cotton, very little has so far been done in Barbados. I have, however, given the matter careful consideration, and I would recommend tentatively the following: Assuming that canes are taken off the land at the end of May, I would get a crop of Indian corn, which I would cut when there was milk in the kernels, and chaff up and feed to the animals. In September I should plant the field in sweet potatoes, which would be dug probably by the end of April the following year. I would then prepare the land for cotton, and plant it in July, allowing it to remain in cotton till the end of May the following year. I should then plant some green dressing crop, to be turned in later, and then plant sugar-cane in December of that year. The rotation would be briefly as follows:—

Canes cut, say, May 1906; Indian corn planted, say, June 1906; sweet potatoes planted, say, September 1906; cotton planted, say, July 1907, and kept in the land until, say, the end of May 1908; a green dressing crop planted, say, June 1908; then canes again in December 1908, to be reaped as plant canes in May 1910. This would be practically a five-year rotation.

In this rotation I should apply most of the farmyard manure to the cane crop.

MANURING COTTON.

A large number of experiments have been carried out in the United States from time to time with the manuring of cotton, and in a bulletin issued by the Department of Agriculture of that country, the following general conclusions are stated to be tentatively established:—

(1) Cotton is a plant which responds promptly, liberally, and profitably to judicious fertilization.

(2) The profit from manuring with concentrated fertilizers is much enhanced by antecedent proper preparation of the soil. It pays to bring cotton lands up to a good condition of 'tilth' by mechanical treatment, and especially by incorporating in them liberal quantities of organic matter.

(3) Barnyard manure and similar bulky manures are more efficient and profitable as soil renovators than as specific fertilizers for cotton. They should be broadcasted liberally and used rather as soil improvers than as immediate fertilizers.

(4) Upon the great majority of the soils of the cotton-growing States it is advisable and profitable to use a complete fertilizer, i.e., one containing soluble phosphoric acid, available potash, and available nitrogen. Nitrogen, however, may probably be advantageously omitted from the concentrated fertilizer, in whole or in part, when the soil has previously been liberally supplied with this ingredient, throughout barnyard manure, green dressing, etc.

In South Carolina, where certain quantities of the Sea Island cotton is grown, it has been found that 20 lb. of nitrogen, 15 lb. of potash, and 50 lb. of phosphoric acid are about the best quantities to apply.

In Barbados, the Department last year undertook certain cotton manurial experiments. On one estate, owing to the attack of the scale insect, the results have had to be discarded. On the other estate, however, the results of the first picking have been very satisfactory. At present the second picking is now being gathered, and later on the results will be published. I may, however, briefly say that, so far, the manuring with nitrogen, phosphoric acid, and potash has given satisfactory results, and roughly speaking, the proportions recommended by the Department, viz., 100 lb. sulphate of ammonia, 300 lb. superphosphate, and 40 lb. sulphate of potash, have given the greatest profit.

EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming, should be addressed to the Commissioner, Imperial Department of Agriculture, Barbados.

All applications for copies of the 'Agricultural News' should be addressed to the Agents, and not to the Department.

Local Agents: Messrs. Bowen & Sons, Bridgetown, Barbados. *London Agents:* Messrs. Dulau & Co., 37, Soho Square, W., and The West India Committee, 15, Seething Lane, E.C. A complete list of Agents will be found on page 3 of the cover.

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Agricultural News

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NOTES AND COMMENTS.

Contents of Present Issue.

The prospects of establishing rubber plantations in the West Indies are discussed in the editorial in this issue. Special reference is made to the possibility of using the Central American rubber tree (*Castilloa elastica*) as a shade tree for cacao.

An interesting account is given on pp. 162-3 of experiments carried on in Cuba with the view of raising seedling sugar-canes. Over 600 seedlings were raised this year—nearly all the result of hand fertilization.

Considerable space is devoted in this issue to the report of the Conference of Cotton Growers recently held at Barbados. The papers read by the Hon. Sir Daniel Morris and Mr. J. R. Bovell appear on pp. 164-7. Sir Daniel Morris dealt with the prospects and requirements of the industry, while Mr. Bovell discussed various important points in connexion with the cultivation of cotton.

On pp. 170-3 will be found a valuable paper by Professor J. P. d'Albuquerque on the Use of Cotton Seed and Cotton-cake-meal as a Feeding Stuff on West Indian Plantations. With the increasing production of cotton seed in the West Indies it is desirable that planters should be informed as to the most economical uses to which this product should be devoted.

Further information regarding the packing and shipping of exhibits for the Canadian Exhibitions is published on p. 175 for the benefit of the various committees having charge of the arrangements.

Agricultural News.

Readers of the *Agricultural News* will observe that, owing to further changes in the sailings of the Royal Mail Steam Packet Company's steamers, it has become necessary once more to alter the date of issue of this fortnightly publication. The *Agricultural News* will be dated the Saturday preceding the departure of the homeward steamer from Barbados, but will be issued in time to be despatched by the outward mail on the previous Tuesday. This issue is therefore dated June 2 instead of May 26.

Permanent Exhibition Committees.

Upon the suggestion of the Imperial Commissioner of Agriculture, the Agricultural and Commercial Society of St. Vincent has elected a Permanent Exhibition Committee. The following gentlemen were appointed:—His Honour the Administrator (Chairman), the Hons. Conrad J. Simmons and J. G. W. Hazell, Messrs. P. F. Huggins and W. C. Proudfoot, with Mr. W. N. Sands (Agricultural Superintendent) as Secretary.

A similar Committee has been appointed by the Agricultural Society of Dominica to be composed of the following:—Dr. H. A. Alford Nicholls, C.M.G., (Chairman), Messrs. A. C. Shillingford, A. E. Agar, Geoffrey Downing, A. J. Brooks, and Joseph Jones (Secretary).

Pamphlet No. 42.

A summary of the results of the manurial experiments with the sugar-cane, carried on, under the direction of the Imperial Department of Agriculture, in the Leeward Islands during the year 1904-5, has been issued as No. 42 of the Pamphlet Series.

The general results, which are clearly set forth in the tables and also in diagrammatic form, are in close agreement with those obtained in previous years.

These experiments having been carried on for five years, in the case of plant canes, and for four years with ratoons, it is now possible to report definite and conclusive results. Thus the experiments have clearly demonstrated that no monetary gains are to be obtained by the use of artificial manures for plant canes. All that is necessary is that a large quantity of good pen manure should be applied to the land. Planters are therefore advised to discontinue the use of artificial manures for plant canes and not to waste money by misdirected efforts in their use.

On the other hand, the results have clearly shown that maximum crops of ratoons can be obtained only by the use of artificial manures. Rapidly acting forms of nitrogen, such as sulphate of ammonia and nitrate of soda, without phosphate and potash, have been proved to give remunerative returns.

It is also desired to draw the attention of planters in Antigua to the appendix to this pamphlet in which it is advised that large tracts of stiff heavy land, now difficult to work, may be much improved by the use of marl.

Burning Cacao Leaves.

Mr. R. D. Anstead, B.A., the Agricultural Superintendent at Grenada, has issued a timely warning to agriculturists in connexion with the practice of burning the cacao leaves. It has been found that this is commonly done by the peasants on their holdings, and it is proposed to dissuade them from such an undesirable practice.

As Mr. Anstead points out, the fall of leaves has been excessive this year on account of the drought; the burning of them therefore means a very considerable loss of plant food, especially nitrogen. Vegetable matter is much needed in the cacao fields, and if the leaves are dug into the land they will add a large amount of humus. 'By burning the leaves, instead of digging them in, this is lost, and the ashes obtained are of comparatively small value.'

Apart from the question of soil fertility, there is also the danger, owing to the extreme dryness of the surrounding vegetation and the prevalence of high winds, of the fires getting out of hand and doing much damage to the cacao trees, which would receive a set-back and probably not bear for some time.

Notes for Cotton Growers.

Many planters have an impression that there are practically no scale insects on cotton plants in Barbados this season. This impression is, however, not correct. In certain fields, at the present time, the plants are practically covered with the black scale, and in almost every field there are individual plants attacked by the white scale. Planters are recommended to be most careful about these pests; every field ought to be examined, and diseased plants should be taken up at once and burned.

Now that the old cotton plants are being taken up, planters are again recommended not to pick the seed-cotton from the bolls which open after the plants have been removed from the field. Most of the undeveloped bolls will open after the plants have been taken up, but the seed-cotton from them is necessarily poor and must not, under any circumstances, be shipped with the rest of the cotton. The mixing of this with even the second-grade cotton will be likely to injure the market value of the latter to a considerable extent. This matter has already been dealt with at some length in the *Agricultural News* (Vol. V, p. 39).

All land which is to be planted in cotton this season should be prepared as soon as possible. Thorough preparation of the soil is very important, and it is also important that the land should be allowed to 'cool out' for some time before the seed is sown. Minor details such as these have a great influence on the quality and quantity of the crop produced.

Reference has been made in the *Agricultural News* to the practice of growing other crops, such as yams, sweet potatoes, and corn, between the rows of cotton. It is hoped that this year there will be no planter so unwise as to continue this practice which has been everywhere a failure.

Curious Oranges.

Mr. A. W. Bartlett, B.A., B.Sc., Government Botanist, British Guiana, recently forwarded to the Imperial Commissioner of Agriculture three curious oranges which are said to have been produced by grafting the sweet orange on to the rough-lemon stock, and which afford an interesting example of the influence of the stock on the scion. The fruits had an external appearance rather of a citron, viz., a thick, coarse, rough skin. The pulp portion was also coarse. The largest fruit might, in this respect, almost have been taken for a shaddock. The flavour and texture of the pulp of the smaller fruits were like those of the orange, though poor.

Such instances do not seem to be unknown, and are regarded as exceptions to the general rule that the scion and stock both retain their individualities.

An analogous instance is apparently afforded by the following quotation from Bailey's *Nursery Book*: 'Graftage may influence the flavour of fruit. There can be no question but that apples often derive acidity from the stock when worked upon the wild crab or upon the Siberian crab.'

In the case of these oranges such an unusual modification might also have been brought about by adverse conditions or by excess of nitrogen in the soil.

The grower states that 'the constant result of grafting on the rough-lemon stock is to produce coarse-skinned fruits.' It would be interesting to know if similar results have been met with by readers of the *Agricultural News*.

Rubber in French West Africa.

The question of improving the rubber industry in French West Africa has been energetically taken up by the Inspector of Agriculture, who has visited all the European rubber markets. A review of these efforts appears in the *Consular Report* for 1904-5. An Ordinance was published in February 1905, applicable to the whole of French West Africa, whose object is to secure the following results: (1) the suppression of adulteration; (2) the preservation of existing rubber trees; (3) the creation of new plantations; and (4) the creation of schools of instruction in the methods of cultivating and gathering rubber.

That the intervention of the Administration has resulted in an improvement in the quality of the rubber exported is shown by the higher prices obtained on the Bordeaux market during the last few years.

Unfortunately, irreparable harm had been done to the existing rubber plants before the Government interfered, so that attention is being principally devoted to the creation of new plantations. It has been found that in many districts it is more advantageous to plant rubber trees, such as Hevea, Funtumia, Ceara, and possibly Castilloa, than the rubber vines. The latter are most successfully propagated by sowing at the foot of the trees which will ultimately serve as their supports. Encouraging results have been obtained with all the trees mentioned above. The system of training native monitors, who subsequently go to teach in the Circle schools, has also given good results.

THE USE OF COTTON SEED AND COTTON-CAKE-MEAL AS A FEEDING STUFF ON WEST INDIAN PLANTATIONS.

BY PROFESSOR J. P. D'ALBUQUERQUE, M.A., F.I.C., ETC.

The recent development of the cotton industry in the West Indies is attended by the production of a large quantity of a valuable feeding stuff—cotton seed. Advantage is taken of this fact to draw attention to one or two principles in the rational feeding of plantation animals in the West Indies with especial reference to the use of cotton seed.

WEST INDIAN FOODSTUFFS.

The foodstuffs available to the West Indian planter may be broadly divided into classes, comprising locally grown and imported materials:—

- (1) Cereals, such as Indian corn, oats, Guinea corn.
- (2) Cotton seed and crushed oil cakes, such as linseed-cake-meal, cotton-cake-meal.
- (3) Green fodders (and hay and ensilage therefrom) such as 'cane-meat,' sour grass, Guinea grass, imphee, woolly pyrol.
- (4) Waste products of manufacture such as molasses, mud-cake, cotton-cake-meal.

THE CONSTITUENTS OF FOODSTUFFS.

The chemical analysis of these various materials has shown that they all contain the same essential constituents but in very different quantities. These essential constituents are:—

Protein or albuminoids, of which the gluten of flour affords a good example.

Fats.

Carbohydrates, such as the different kinds of sugars and starches and crude fibre which exist in considerable quantities in all green fodders and their hay and ensilage.

THE FUNCTIONS OF PROTEIN.

The importance of these constituents will be best realized by a consideration of the duties which they perform in the animal organism.

The protein is chiefly concerned with, and is essential for, the building up and healthy maintenance of the muscles, glands, and nervous tissues, in fact of the living substance called protoplasm, the active constituent of all living organs. Protein is the nitrogenous constituent of food, and nitrogen is an essential element of protoplasm. In the ordinary course of life there is wear and tear and consequently waste of muscular and glandular tissue. The nitrogen of this waste or loss appears in the excreta in the form of urea, uric and hippuric acids, and must be replaced by the protein of foods. The amount of nitrogenous waste increases with the amount or rate of work done by the animal. The amount of protein in the diet must be correspondingly varied. In this waste of protoplasm, which is made good by protein food, energy is given out and appears in the form of the work done by the animal, and in the form of animal heat. The protein of the food cannot, however, account for all the work and heat produced by an animal. Nor can it account for all the fat laid on in fattening, or the production of milk in lactation. Only an excessive amount of protein, injurious and expensive, could account for the work, heat, increase of fat or milk.

THE FUNCTIONS OF CARBOHYDRATES AND FATS.

The greater quantity of work and heat produced by an animal, and the greater quantity of the fat laid on are produced by the animal organism at the expense of the carbohydrates (sugars and starches) and fats in the food. Crude fibre serves to give bulk to the food of such ruminant

herbivora as oxen, and is to some extent digested by them, acting, to a limited extent, like starches and sugars.

The larger proportion of a food ration will therefore consist of carbohydrates, the smaller of protein.

Carbohydrates (sugars and starches) are highly fattening constituents of diet. To a certain extent fats and carbohydrates can take the place of one another: thus carbohydrates when cheap and abundant are usually increased and the fats diminished. The increase, beyond a certain point, of fats is not advisable or economical, as foods containing much fat are difficult of digestion by herbivora, and an undue amount of them may prove injurious.

CARBOHYDRATES ABUNDANT, PROTEIN DEFICIENT, IN GREEN FODDERS.

In the West Indies, as everywhere else, carbohydrates are relatively abundant in the common green fodders such as grasses and cane meat, but the protein* is scarce. There is therefore no difficulty in supplying an abundance of cheap home-grown carbohydrates, whether the object be the production of work or the putting on of fat. The real difficulty is to obtain an adequate, though relatively small, supply of protein to replace the nitrogenous waste of working animals or to build up the tissues of growing animals.

COTTON-CAKE-MEAL A SOURCE OF PROTEIN.

The importance of cotton seed as a feeding stuff here becomes manifest. The chief sources of protein in the West Indies are oats, Indian corn, linseed cake, and *cotton seed* or, better, *cotton-cake-meal*. Cotton-cake-meal contains nearly three times as much protein as oats.

DIGESTIBILITY OF FOOD CONSTITUENTS.

Before the protein, carbohydrates, and fats in a given diet can be made use of by the animal economy, they must be digested. That is, they must, in a more or less finely divided condition, come under the action of the digestive juices in the stomach and other parts of the digestive tract. As a result of this action, the protein and carbohydrates are dissolved and the fats converted into an 'emulsion' like milk. In this way they pass into the blood vessels and are carried to the muscles and organs for use.

It is found by actual experiment, however, that not all the protein, fat, or carbohydrate in any food can be thus digested. A part only of what we find by chemical analysis is actually digestible; the balance is lost in the excreta, being useful only as manure.

We therefore have to inquire—What are the total amounts of protein, carbohydrates, and fats to be found in the principal West Indian foodstuffs, and what proportions of them are digestible? That question is approximately answered in Table I.

FEEDING STANDARDS.

The next question is—What quantity of digestible protein, carbohydrates, and fats should be given to the various plantation animals in different circumstances? How much, for example, to an ox resting, an ox moderately worked, an ox heavily worked? How much to a mule resting, under moderate, under heavy work? How much to a milch cow, and so on?

* Jamaica Guinea grass hay (see analyses by Mr. H. H. Cousins, *West Indian Bulletin*, Vol. V, pp. 106-7) appears to be an exception to this statement.

FOOD RATIONS.

And finally, we must ascertain how to blend and apportion the foodstuffs available on the West Indian plantation in order to supply the amounts of digestible protein, carbohydrates, and fats indicated as necessary in the answer to the preceding question.

The composition and digestibility of American and European farm foods, and feeding standards for the varying conditions of farm animals have been laboriously worked out by chemical analysis and by carefully conducted experiments: Lawes and Gilbert, at Rothamsted, and a number of eminent German and American scientists have contributed to this important work. Two of the best-known books in English upon this subject are the classical *Farm Foods* by Wolff, translated by Mr. H. H. Cousins (Government and Agricultural Chemist at Jamaica), and *Feeds and Feeding* by Mr. W. A. Henry (Director of the Agricultural Experiment Station, University of Wisconsin).

The digestibility of the constituents of West Indian green fodders has not been experimentally worked out. In Table I the digestibility of cane meat has been assumed to be approximately the same as that of American Guinea corn meat, while the digestibility of West Indian grasses has been assumed to be approximately the same as that of American pasture grass.

Table II gives some of the feeding standards prepared by Wolff, as recently modified by Lehmann. The rations given by Wolff for the horse are here adopted for the mule.

Table III gives a selection of rations suggested for trial for West Indian plantations. They should not be accepted as absolute but rather as suggestive of rations for cautious trial, to be modified by the planter's own experience.

The rations suggested for such trial with an ox or a mule moderately worked, using cotton-cake-meal and either cane meat or sour grass are of special importance to sugar plantations and are therefore given below.

For an ox moderately worked, as follows:—

PER DIEM.
Per 1,000 lb. live weight. Per ox of 600 lb.

Cane meat ...	60 lb.	...	36 lb.
Cotton-cake-meal * ...	8 lb.	...	5 lb.
(undecorticated)			
or			
Sour grass ...	40 lb.	...	24 lb.
Cotton-cake-meal ...	6 lb.	...	4 lb.
(undecorticated)			

For a mule moderately worked as follows:—

PER DIEM.
Per 1,000 lb. live weight. Per mule of 800 lb.

Cane meat ...	70 lb.	...	56 lb.
Cotton-cake-meal ...	9 lb.	...	7 lb.
(undecorticated)			
or			
Sour grass ...	60 lb.	...	50 lb.
Cotton-cake-meal ...	4 lb.	...	5 lb.
(undecorticated)			
or			
Cane meat ...	60 lb.	...	50 lb.
Corn ...	4 lb.	...	3 lb.
Oats ...	2 lb.	...	1½ lb.
Cotton-cake-meal ...	6 lb.	...	3 lb.
(undecorticated)			

* Undecorticated, that is, with the hulls.

or			
Sour grass ...	50 lb.	...	40 lb.
Corn ...	4 lb.	...	3 lb.
Oats ...	2 lb.	...	1½ lb.
Cotton-cake-meal ...	3 lb.	...	2 lb.
(undecorticated)			

DIGESTIBILITY OF GREEN FODDER VARIES WITH AGE.

It should be borne in mind that cane meat and any other green fodder varies very greatly in digestibility and nutritive value according as it is green and succulent or old and dry.

In the latter case the amount must be increased, and even then, in the absence of other green fodder, the animals will not retain their sleekness. The same considerations apply to grasses. Grasses should be cut just before they burst into flower. What cannot then be used should be made into hay or, in wet weather, into ensilage. In this way the proportion of their ingredients that remain available is greater than if they were allowed to grow old.

It will be found necessary to introduce cotton seed or cotton-cake-meal *gradually* into the rations, in order to accustom the animals to the change of flavour. At first cotton-cake-meal might be mixed with linseed-cake-meal and the quantity of the former gradually increased at the expense of the latter until the full quantity of cotton-cake-meal is used. It might also be flavoured with a little molasses.

COTTON-CAKE-MEAL SUPERIOR TO COTTON SEED AS A FEEDING STUFF OR MANURE.

An important question is the relative feeding value of cotton seed (disintegrated) and cotton-cake-meal. In Table III prominence is given to cotton-cake-meal because it is believed that whenever an oil factory renders this course possible, the planter will give preference to that form.

The primary object of using any form of cotton seed product for feeding purposes is to obtain protein to balance the carbohydrates of the green fodder. This can be readily effected by the use of cotton seed, but as a rule, only by giving at the same time a large excess of fat.

If, for example, with cane meat, cotton seed, whole or disintegrated, is used in sufficient amount to balance the carbohydrates and afford rations for the animals enumerated in Table III, the accompanying excess of fat amounts to from ½ lb. to 2½ lb. of fat per diem.

The objection to this excess of fat is not confined to the waste of the oil, a valuable article of commerce. Such authorities as Wolff, in Germany, and Henry, in the United States, emphasize the fact that excess of fats (and they specify the fat of cotton seed) when fed to working oxen and horses causes digestive derangement. As a result, not only is the fat lost but the digestive system is upset, and by purging or other means parts of the protein and carbohydrates are also lost. The excess of fat is therefore not only a waste in itself, but causes waste of other valuable constituents of the food.

This is the view of scientific authorities on farm foods. Practical cotton farmers in the Southern States of America show that experience bears this out by sending their cotton seed to be crushed at central mills, either for cash (average price, U. S. A. season 1900-3, \$15.75 per ton, see Lambornes' *Cotton Seed Products*) or for a return of 800 lb. of decorticated meal (equivalent to about 1,800 lb. of undecorticated cake-meal) per 1 ton of seed. That is, they give up part of the oil just for extraction of that part of the oil from the seed.

THE USE OF COTTON SEED, ETC., ON WEST INDIAN PLANTATIONS.

(Continued.)

Another point in favour of the cake-meal is the removal of the linters, which is left on the ginned seed, but is removed by the delinting machine preparatory to the expression of the oil.

The keeping properties of these different products should also be considered. Cotton cake (unground) being a compressed and sterilized residue, keeps even in the West Indian climate for a long time without deterioration. Cotton seed and, still more, disintegrated cotton seed, as a feeding stuff, more or less rapidly deteriorates.

Finally, it may be mentioned that, directly applied to the land, cotton-cake-meal decomposes more rapidly than cotton seed, and the manurial constituents of the former are therefore more readily available.

It may therefore be laid down, wherever an oil factory is available at which reasonable terms can be secured, that it is the correct and economical course to exchange the seed for a corresponding amount of whole or crushed cake.

Wherever possible the cake should be stored at the factory and the crushed meal delivered to the planter as required. When distance or freight difficulties render this course impossible, the cake should be kept in a dry place and ground on the plantation.

TERMS FOR THE EXCHANGE OF COTTON SEED.

Having arrived at this conclusion, the planter will next proceed to consider the terms upon which he should exchange his seed for cotton cake or cotton-cake-meal. These conditions must obviously depend upon the market price of cotton seed oil and its products. In the oil factory the cotton seed is heated by steam and then subjected to hydraulic pressure. In this way most of the oil is expressed, but the whole of the protein remains. Analyses of the cotton seed and the cotton cake, as prepared at the Barbados factory, show that a ton (2,240 lb.) of cotton seed gives about 1,700 lb. of undecorticated cotton cake, containing all the protein of the seed, a suitable proportion of fat for feeding purposes, all the nitrogen, and practically all the phosphate and potash for manurial purposes.

The British Cotton-growing Association, acting under the advice of the Imperial Department of Agriculture, made a grant to Messrs. H. E. Thorne & Son to enable them to erect a cotton oil factory in Barbados. This grant was made subject to certain conditions which the Imperial Department of Agriculture, after careful consideration and consultation, recommended to the Association as securing advantageous pecuniary conditions to the West Indian planter in the exchange or sale of his cotton seed. These conditions may therefore at present be accepted as a standard for the guidance of planters in any transactions of this kind.

The terms offered by Messrs. H. E. Thorne & Son are given below:—

For Barbados.—\$5.00 and 1,800 lb.* of cotton cake or cotton-cake-meal by instalments as required for every 2,240 lb. of fresh and good-quality seed, both delivered at the factory, or \$24.00 per ton of cotton seed with no return of cotton cake.

For West India Islands.—Messrs. Thorne & Son pay \$24.00 per ton of fresh and good-quality seed delivered at

Barbados: they sell back the cake-meal at \$21.00 per ton, at Barbados. Estimating the freight at \$2.40 per ton each way, this works out to 1,800 lb. cotton cake, and \$2.80 per ton of seed.

With regard to the value of the oil manufactured from West Indian cotton seed, it may be stated that Messrs. Thorne & Son have succeeded in producing oil of high quality.

COTTON SEED OR COTTON CAKE MUST NOT BE FED TO CALVES OR PIGS.

Before closing this article, it should again be pointed out that cotton seed or cotton-seed-cake or cotton-cake-meal must not be fed to calves or pigs, as cotton seed products act poisonously on those animals.

COTTON CAKE SHOULD BE RETAINED FOR THE PLANTATION.

Finally, the fundamental importance to cotton growers of retaining the seed for use in their own land has all along been insisted upon by the Imperial Department of Agriculture. By far the best way of doing this is to express the oil, to feed the animals (other than pigs) with the residue of oil cake, and to apply the resulting manure to the land. By so doing the monetary value, feeding value, and manurial value of the cotton seed are utilized to the utmost advantage.

TABLE I.

COMPARISON OF WEST INDIAN FEEDING STUFFS.

	Total in 100 lb.					Digestible in 100 lb.			
	Dry matter.	Proteins.	Carbohydrates.	Fibre.	Fats.	Proteins.	Carbohydrates.	Fibre.	Fats.
	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.
Oats * ...	89.1	11.8	59.7	9.5	5.0	9.2	45.4	1.9	4.2
Indian corn* ...	89.4	10.3	70.4	2.2	5.0	7.8	65.5	1.2	4.3
Linseed-cake-meal ...	90.2	35.0	35.5	7.5	7.3	31.1	27.7	4.3	6.5
Cotton seed (Barbados, average of three samples) ...	90.1	20.6	27.8	16.6	21.0	14.0	13.9	12.6	18.2
Cotton-cake-meal (Barbados, average of three samples) ...	89.5	29.2	30.7	16.6	7.0	18.1	16.6	7.6	5.9
Cane meat (Tops) † ...	31.6	1.3	16.6	11.1	0.3	0.6	12.3	6.5	0.2
Guinea corn meat † ...	17.7	1.6	9.2	5.0	0.3	0.7	6.8	2.9	0.2
Sour grass † ...	48.0	3.0	22.6	17.9	1.3	2.1	16.5	13.6	0.8
Guinea grass hay ‡ (cut before flowering)	83.7	6.7	36.5	33.7	1.2	4.7	26.6	25.6	0.7
Para grass † ...	27.1	1.4	13.9	9.6	0.2	0.8	7.5	7.3	0.1

* Analyses quoted from Henry's *Feeds and Feeding*.

† Analyses by F. Watts.

‡ Analysis by H. H. Cousins.

* As mentioned above, analyses show that this amount of cake is really greater than that obtained from 1 ton of seed. The conditions of the grant require Messrs. Thorne & Son to pay \$5 per ton of seed and to return the cake, obtained therefrom, ready ground.

TABLE II.
FEEDING STANDARDS.

	Per day per 1,000 lb. live weight.			
	Dry matter. lb.	Proteins. lb.	Carbohydrates. lb.	Fats. lb.
Ox at rest...	18	0.7	8.0	0.1
Ox medium work...	25	2.0	11.5	0.5
Ox heavy work ...	28	2.8	13.0	0.8
Milch cow (16.6 lb. milk)...	27	2.0	11.0	0.4
Mule light work ...	20	1.5	9.5	0.4
Mule medium work ...	24	2.0	11.0	0.6
Mule heavy work...	26	2.5	13.3	0.8

TABLE III.
FOOD RATIONS.

	Per day per 1,000 lb. live weight.				
	Ox at rest.	Ox medium work.	Ox heavy work.	Milch cow yield- ing 16½ lb. milk.	Mule medium work.
Cane meat ...	50	60	75	50	70
Cotton-cake-meal * (undecorticated)	2	8	12	9	9
Sour grass ...	30	40	40	40	60
Cotton-cake-meal * (undecorticated)	2	6	11	8	4
Cane meat ...					60
Corn...					4
Oats...					2
Cotton-cake-meal * (undecorticated)					6
Sourgrass ...					50
Corn...					4
Oats...					2
Cotton-cake-meal * (undecorticated)					3

Undecorticated, i.e., with the hulls.

An interesting Animal. A correspondent in Barbados has recently forwarded to the Imperial Department of Agriculture a specimen of an interesting animal known as *Peripatus*. This is a very primitive form of animal life and stands as a representative, in the present day fauna, of the ancestral types from which insects and their near relatives have been developed through long ages. In general appearance it is similar to the centipedes in having several pairs of legs along the sides of the body, while it resembles the slugs in being soft-bodied. *Peripatus* is known to occur in the West Indies, but as it lives in damp situations and avoids the light, it is rarely seen.

A NEW TUBER.

The following is extracted from a note in the *Journal of the Board of Agriculture* (London), for April, on 'A New Tuber' (*Solanum commersoni*) belonging to the potato family :—

This tuber, originally obtained from Uruguay, was cultivated experimentally by M. Labergerie, and produced in 1901 several distinct varieties, one of which, the violet type, attracted much attention, and gave promise of proving a useful edible variety, yielding heavily and being entirely resistant to disease. The cultivation of the different varieties has been continued under very careful supervision, and it may be noted that the varieties, as well as the original type, appear very susceptible to cultivation and rapidly improve when grown in fertile soils. The violet variety now resembles externally the ordinary European potato, but the yield appears to be from 30 per cent. to 100 per cent. greater on moist or wet land.

It is considered that the remarkable adaptation of the *Solanum commersoni* (violet) to wet soils and its large yields make it suitable for cultivation on marsh lands, etc., hitherto uncultivated.

In a previous issue of the same journal (October 1904) it was stated :—

A yield of about 6½ tons per acre was obtained in 1902, and about 4½ tons in 1903, on a fertile soil, but without any manuring or cultivation beyond a single hoeing when the shoots first appeared. The subsequent very abundant growth was sufficient to choke all weeds

The tubers are rich in starch and may prove valuable as an industrial plant. They are much appreciated by stock.

WEST INDIAN TRADE.

In presiding at a meeting of the Colonial Bank held in London last month, Mr. Dobree, the Chairman, made the following reference to the sugar and other industries in the West Indies :—

With regard to the future of the sugar industry in the West Indies, it had been conclusively proved that, with the best methods of cultivation and the planting of certain canes in certain soils, a better extraction of sugar was obtained, and sugar from the cane could be produced at a lower cost than sugar from beet-root. All the West Indies asked was a fair field and no favour, and the assurance of not being handicapped by bounties. The cacao industry was flourishing, but the West Indies were suffering from drought. Jamaica was in a very satisfactory state, there being a fine crop of bananas this year.

DEPARTMENT NEWS.

As briefly mentioned in the last issue of the *Agricultural News*, the Imperial Commissioner of Agriculture will proceed to the United Kingdom on duty leave on June 5 next. During the Commissioner's absence, Professor J. P. d'Albuquerque, M.A., F.I.C., F.C.S., will be authorized to sign official correspondence.

The Hon. Sir Daniel Morris, K.C.M.G., left Barbados in R.M.S. 'Eden' on Tuesday, May 15, on a visit to Grenada. He returned to Barbados on May 22.



GLEANINGS.

Grafted mango plants of the following varieties can be purchased at the Dominica Botanic Station at the rate of 2s. per plant: Julie, Gordon, Amelia, and Ceylon No. 1.

The donkey stallion 'Yankee Boy' will stand for service at the Agricultural School, Dominica, during the season at a reduced fee of 6s.

The *Journal of the Jamaica Agricultural Society* for April contains the draft of a proposed bill entitled 'A Law for the Prevention of the Spread of Contagious Diseases among Animals.' It provides for the separation of affected animals and the notification of the presence of disease; also the declaration by the Governor of 'infected places.'

The Shea butter tree (*Butyrospermum Parkii*) is extremely common in the Senegal-Niger territory. It is largely used by the natives for cooking, and therefore they do not destroy the trees. Should a demand arise for this product, the colony could supply large quantities. (*Consular Report on French West Africa, 1904-5.*)

According to the *Board of Trade Journal*, there was a great shortage in the production of camphor in Formosa last year. The more easily accessible trees have nearly all been cut down. The camphor oil is all sent to the refineries in Japan, where about 49 per cent. of camphor is extracted from it.

The Magistrate of Districts II and III in St. Lucia states in his annual report for 1905: 'Agriculture suffered owing to the emigration of the labouring population to Colon and Cayenne. The men leave and the women remain, with dire results to existing cultivation and a consequent decrease in the opening up of new areas. The price of cacao was low, and, despite a fair crop, the spending power of the people was noticeably reduced.'

Until the year 1888 there was no direct importation of tropical fruit into Baltimore, with the exception of pineapples brought in small schooners from the Bahama Islands. In one week of 1905 the enormous number of 169,839 bunches of bananas were landed at Baltimore. The value of the bananas received during the past year was £289,387, an increase of £60,000 over 1904. (*Consular Report on the trade of Maryland, etc., for 1905.*)

Mr. J. E. Beckett, Agricultural Instructor, British Guiana, will shortly be sent on a special mission to the Pomeroon and North West to study the question of rubber production. Mr. Beckett has instructions to make collections of the different rubber-producing plants with a view to their scientific identification. Large quantities of seeds of the Para rubber tree (*Hevea brasiliensis*) have been ordered by the Government from Ceylon. (*Argosy, May 12.*)

The *Journal of the Jamaica Agricultural Society* is urging banana growers to follow the example of some of the large estates in carrying back their banana trash (brought down to the dépôts with the fruit as packing) and spreading it on the land as a mulch.

Messrs. Henry W. Frost & Co., of Charleston, South Carolina, report under date April 28 as follows: 'Islands and Coast of Carolina—The weather has been favourable for all plantation work, and the crop is all planted and only requires rain in some sections to furnish enough moisture to cause the seed to germinate. We have little or no change to report in the acreage or quality of the crop planted. The outlook is for a good average start.'

From statistics kindly supplied by the Acting Collector and Surveyor of Customs at Trinidad, it is observed that during the period October 1, 1905, to March 31, 1906, the following shipments of fruits were made from that colony: bananas in crates, 5,291; bananas, without crates, 4,691; total value of bananas, £2,096. Oranges, 2,993 packages, valued at £1,327; all other fruit (of which a large portion was probably bananas), £279. The total value of the fruit shipped during the period was thus £3,703.

Tabulated analyses of rum produced in British Guiana have been prepared by Professor J. B. Harrison, C.M.G., and published for general information. It is stated: 'This shows that, as in the crop of 1903-4, the variation in the contents of esters was very great, ranging from 30.1 to 122.7 parts per 100,000 of alcohol by volume. The mean contents of esters in the rum from distilleries in Demerara was 59.7 parts, that of the rum from distilleries in Essequibo 69.5 parts, and that of rum from Berbice 76.1 parts.'

In his report on French West Africa for 1904 and 1905, H. M. Consul General at Dakar describes the efforts made by the Inspector of Agriculture in the direction of improving the methods of cultivating and gathering rubber. The Government in turning its chief attention to the creation of new plantations, and one of the principal results of the researches and experiments made in this direction, has been the recognition of the fact that in many districts it is more advantageous to plant rubber trees than the rubber vine. (*Board of Trade Journal.*)

The *Annual Report* on the primary schools of St. Lucia for 1905 has the following: 'The question of improving the system of agricultural instruction in the primary schools, a very important one, is at present under consideration. There is no doubt but that the great majority of the school gardens of the colony can be divided into two classes: those that have become little market gardens, cultivated for profit, and those which are neglected. Taken as a whole, the state of the gardens is unsatisfactory. There are, of course, a few exceptions.'

In his report for the month of March, Mr. T. Osment, Agricultural Instructor at St. Vincent, reports that during the period under review he has been chiefly engaged in the distribution of manures for provision crops to allottees under the Land Settlement Scheme. He also visited the estates at Linley Valley and inspected the allotments. He reports that the prices obtained by allottees for ground provisions and arrowroot have been satisfactory, and in one case 75 bags of tannias, reaped from 1½ acres, netted £15 12s. 6d., which is a good return.

CANADIAN EXHIBITIONS, 1906.

As already stated in the pages of the *Agricultural News*, the arrangements for the Canadian Exhibitions to be held at Toronto (from August 27 to September 10) * and at Halifax (from September 22 to October 15) next, have now arrived at a fairly advanced stage.

With the view of assisting the Secretaries of the various committees that will have charge of the details, it would be desirable to afford fuller information in regard to the movements of the steamers of the Canadian Line, by which Messrs. Pickford & Black have kindly offered to carry all exhibits free of charge.

TORONTO GENERAL EXHIBITION.

The first steamer that might be utilized for conveying such decorative material as bamboo stems, dried leaves of the cocoa-nut palm, bunches of cocoa-nuts, dried sugar-cane leaves, ornamental grasses, as also all dried and cured exhibits that have been packed securely in bottles and boxes, would be that due to leave Demerara on June 30, touching at the various islands as follows: Trinidad, July 4; Tobago, July 5; Grenada, July 6; St. Vincent, July 7; Barbados, July 10; St. Lucia, July 11; Dominica, July 12; Montserrat, July 13; Antigua, July 14; St. Kitt's, July 16, and arriving at Halifax on July 24. The next steamer would be S.S. 'Oruro' due to leave Demerara on July 18, touching at the various islands as follows:—Trinidad, July 21; Barbados, July 24; St. Vincent, July 25; St. Lucia, July 25; Dominica, July 26; Montserrat, July 27; Antigua, July 28; St. Kitt's, July 30, and arriving at Halifax on August 7.

A later opportunity that might be utilized for shipping fresh fruit and vegetables for the Toronto Exhibition would be by S.S. 'Orinoco' due to leave Demerara on July 28, touching at the various islands as follows: Trinidad, August 1; Tobago, August 2; Grenada, August 3; St. Vincent, August 4; Barbados, August 7; St. Lucia, August 8; Dominica, August 9; Montserrat, August 10; Antigua, August 11; St. Kitt's, August 13, and arriving at Halifax on August 21. This steamer would deliver the exhibits just six days before the exhibition opens at Toronto.

DOMINION EXHIBITION AT HALIFAX.

In the case of the Halifax Exhibition, it has been arranged by Messrs. Pickford & Black that all the dried and cured exhibits shown at the Toronto Exhibition will be carefully re-packed and transferred in time to be shown at the Halifax Exhibition.

In addition it is suggested that arrangements be made for sending forward a supply of fresh fruit and vegetables as well as any further decorative material that may be required for special use for the Halifax Exhibition. A convenient opportunity for shipping them will be offered by the steamer due to leave Demerara on August 25, touching at the various islands as follows: Trinidad, August 29; Tobago, August 30; Grenada, August 31; St. Vincent, September 1; Barbados, September 4; St. Lucia, September 5; Dominica, September 6; Montserrat, September 7; Antigua, September 8; St. Kitt's, September 10 and arriving at Halifax on September 18, that is, four days before the exhibition opens.

SELECTION OF EXHIBITS.

As already stated, the exhibits proposed to be sent to the Canadian Exhibitions are to be bona fide commercial samples and not curios or fancy articles. The decorative material referred to above is to be utilized for making the

courts attractive, and for the purpose of suggesting the tropical conditions under which the crops of the West Indies are produced. In the case of sugars, rum, molasses, preserves, honey, cacao, coffee, arrowroot, cassava, dried ginger, cashew nuts, dried peppers, cotton, starches, oils, India rubber, etc., all these will require to be carefully put up in closely fitting glass jars and bottles. In addition it would be useful if some of the dried products were also forwarded in small boxes (about 1 foot cube) with sliding glass covers, so that visitors may be able to handle the contents and satisfy themselves as to their quality and value.

LABELLING EXHIBITS.

It would be useful if, in the first instance, a number were attached to each exhibit, and a list forwarded so that in the event of the labels being damaged the name of the exhibit could be attached at the exhibition. On application to the Imperial Commissioner of Agriculture, samples of labels would be forwarded, with the cost of printing in each case. It would be desirable, for the purpose of preservation, if the labels could be covered with a colourless varnish similar to that described in the *Agricultural News*, Vol. V, p. 101. Where possible, the labels should be descriptive and bear the shipping mark of the estate from which the sample has been obtained. A quantity of blank labels should be forwarded to Messrs. Pickford & Black to replace any that may have been lost or damaged in transit. It is important to bear in mind that the labels should be placed at the bottom of the bottle and not in the middle, in order that the contents may be fully in view.

PACKING EXHIBITS.

In packing glass jars and bottles, it is important that they should first of all be carefully inspected in order to detect leakage. It should also be borne in mind that they will be liable to be knocked about in transit; each bottle should, therefore, be carefully isolated, being packed with straw, shavings, or saw dust.

The bottles containing liquids should, if possible, be packed by themselves and not in the same case with cured and dried produce such as cacao, starches, etc.

Fresh fruits and similar articles, which it is proposed to exhibit in glass jars, should be placed in a solution of formalin (4 per cent.). This can be made by adding 10 parts by weight of commercial formalin to 100 parts of water.

SHIPPING ARRANGEMENTS.

As already mentioned, Messrs. Pickford & Black have undertaken to carry all exhibits from the West Indies free of charge. These should be ready for shipment the day before the steamers are due at each port. Each case should be marked 'Exhibits from——' (mentioning the name of the colony) and addressed to Messrs. Pickford & Black, Halifax. Full particulars respecting the number and marks of the cases and the contents should be forwarded to Messrs. Pickford & Black by the same steamer as the exhibits.

Fresh Fruit.—It is desirable that supplies of fresh fruit, vegetables, and other perishable commodities, should be forwarded for the Toronto Exhibition by the steamer due to arrive at Halifax on August 21, and for the Dominion Exhibition at Halifax by the steamer due to arrive at that port on September 18. A letter giving notice of the intention to ship fresh fruit and vegetables should be forwarded to Messrs. Pickford & Black by the previous steamer.

* These dates have been slightly altered since the publication of the article in the last number of the *Agricultural News*.

MARKET REPORTS.

London,—May 2, 1906. Messrs. KEARTON, PIPER & Co.; Messrs. E. A. DE PASS & Co.; 'THE WEST INDIA COMMITTEE CIRCULAR'; 'THE LIVERPOOL COTTON ASSOCIATION WEEKLY CIRCULAR,' April 27; and 'THE PUBLIC LEDGER,' April 28, 1906.

ALOES—Barbados, 15/- to 60/-; Curaçoa, 20/- to 65/- per cwt.

ARROWROOT—St. Vincent, 2d. per lb.

BALATA—Sheet, 1/4 to 1/11; block, 1/4 to 1/4½ per lb.

BEES'-WAX—£8 per cwt.

CACAO—Trinidad, 52/- to 60/- per cwt.; Grenada, 48/- to 53/- per cwt.

CARDAMOMS—Mysore, 7½d. to 3/- per lb.

COFFEE—Jamaica, good ordinary, 39/- to 41/- per cwt.

COTTON—West Indian, medium fine, 6·55d.; West Indian Sea Island, medium fine, 13½d.; fine, 14½d.; extra fine, 16d. per lb.

FRUIT—

BANANAS—Jamaica, 4/- to 6/- per bunch.

GRAPE FRUIT—14/- to 16/- per box.

LIMES—4/- to 4/6 per box.

ORANGES—Jamaica, 7/- to 10/- per case.

PINE-APPLES—St. Michael, 1/9 to 5/- each.

FUSTIC—£4 to £4 10s. per ton.

GINGER—Jamaica, 60/- to 65/- per cwt.

HONEY—18/- to 27/- per cwt.

ISINGLASS—West Indian lump, 1/9 to 2/2; cake, 1/1 to 1/3 per lb.

KOLA NUTS—4d. to 6d. per lb.

LIME JUICE—Raw, 11d. to 1/2 per gallon; concentrated, £20 per cask of 108 gallons; hand-pressed, 2/2 to 2/6 per lb. Distilled Oil, 1/7 to 1/8 per lb.

LOGWOOD—£4 to £4 15s.; roots, £3 10s. to £4 per ton.

MACE—Fair to good pale, 1/5 to 1/6 per lb.

NITRATE OF SODA—Agricultural, £11 12s. 6d. per ton.

NUTMEGS—60's, 1/7; 65's, 1/4; 72's, 10d.; 99's, 7d.; 108's, 6d. per lb.

PIMENTO—Fair, 2½d. to 2½d. per lb.

RUM—Jamaica, 2/1 per proof gallon; Demerara, no quotations.

SUGAR—Yellow crystals, 14/- to 15/- per cwt.; Muscovado, 13/- per cwt.; Molasses, 11/- to 15/- per cwt.

SULPHATE OF AMMONIA—£12 3s. 9d. to £12 15s. per ton.

Montreal,—March 19, 1906.—Mr. J. RUSSELL MURRAY.
(In bond quotations, c. & f.)

COCOA-NUTS—Jamaica, \$26·50 to \$28·50; Trinidad, \$25·00 to \$26·00 per M.

COFFEE—Jamaica, medium, 10c. to 11c. per lb.

GINGER—Jamaica, unbleached, 10c. per lb.

MOLASCUIT—Demerara, \$1·00 per 100 lb.

MOLASSES—Barbados, 27c. to 28c.; Antigua, 23c. per Imperial gallon.

NUTMEGS—Grenada, 110's, 18c. per lb.

ORANGES—No quotations.

PIMENTO—Jamaica, 5½c. per lb.

SUGAR—Grey crystals, 96°, \$2·10 to \$2·20 per 100 lb.

—Muscovados, 89°, \$1·60 to \$1·75 per 100 lb.

—Molasses, 89°, \$1·40 to \$1·50 per 100 lb.

—Barbados, 89°, \$1·55 to \$1·80 per 100 lb.

New York,—May 4, 1906.—Messrs. GILLESPIE BROS. & Co.

CACAO—Caracas, 12c. to 13c.; Grenada, 10½c. to 10¾c.; Trinidad, 11c. to 11½c.; Jamaica, 9½c. to 10c. per lb.

COCOA-NUTS—Jamaica, \$21·00 to \$22·00; Trinidad, \$18·00 to \$19·00 per M.

COFFEE—Jamaica ordinary, 8½c. to 8½c.; good ordinary, 8¾c. per lb.

GINGER—No quotations.

GOAT SKINS—Barbados, Dominica, and Antigua, 56c. to 58c.; Jamaica, 58c.; St. Kitt's, 49c. per lb.

GRAPE FRUIT—Jamaica, \$5·00 to \$8·00 per barrel; \$2·50 to \$4·00 per box.

MACE—29c. to 34c. per lb.

NUTMEGS—West Indian, 80's, 22½c.; 90's, 20c.; 100's, 18½c.; 110's, 15½c. per lb.

ORANGES—Jamaica, \$4·00 to \$4·25 per barrel; \$2·00 to \$2·25 per box.

PIMENTO—4½c. to 5c. per lb.

PINE-APPLES—No quotations.

SUGAR—Centrifugals, 96°, 3·48c.; Muscovados, 89°, 3c.; Molasses, 89°, 2¼c. per lb.

INTER-COLONIAL MARKETS.

Antigua,—May 17, 1906.—Messrs. GEO. W. BENNETT BRYSON & Co., LTD.

SUGAR—\$1·45 to \$1·50 per 100 lb.

MOLASSES—18c. per gallon.

Barbados,—May 14, 1906.—Messrs. T. S. GARRAWAY & Co., and Messrs. JAMES A. LYNCH & Co.

ARROWROOT—St. Vincent, \$4·00 to \$4·25 per 100 lb.

CACAO—\$11·25 to \$11·50 per 100 lb.

COCOA-NUTS—\$10·00 per M. for husked nuts.

COFFEE—\$10·50 to \$11·75 per 100 lb.

HAY—\$1·20 per 100 lb.

MANURES—Nitrate of soda, \$65·00; Ohlendorff's dissolved guano, \$55·00; Cotton manure, \$48·00; Sulphate of ammonia, \$75·00; Sulphate of potash, \$67·00 per ton.

MOLASSES—Muscovado, 18c. per gallon.

ONIONS—Lisbon, \$4·05 to \$5·08 per 100 lb.

POTATOS, ENGLISH—Nova Scotia, \$2·10 to \$2·25 per 160 lb.

RICE—Balam, \$5·40 to \$5·50 per bag (190 lb.); Patna, \$3·30; Rangoon, \$2·65 to \$2·75 per 100 lb.

SUGAR—Muscovados, 89°, \$1·45; dark crystals, 96°, \$1·85 per 100 lb.

British Guiana,—May 19, 1906.—Messrs. WIETING & RICHTER.

ARROWROOT—St. Vincent, \$8·00 per barrel.

BALATA—Venezuela block, 25c.; Demerara sheet, 38c. per lb.

CACAO—Native, 13c. to 14c. per lb.

CASSAVA STARCH—\$3·50 to \$3·75 per barrel.

COCOA-NUTS—\$10·00 to \$12·00 per M.

COFFEE—14c. to 15c. per lb.

DHAL—\$5·40 to \$5·50 per bag of 168 lb.

EDDOES—\$1·32 per barrel.

MOLASSES—15½c. per gallon.

ONIONS—Lisbon, 6c. to 7c. per lb. (ex store).

PLANTAINS—20c. to 40c. per bunch.

POTATOS, ENGLISH—\$2·30 to \$2·40 per barrel.

POTATOS, SWEET—Barbados, \$1·56 per bag.

RICE—Ballam, \$5·25 per 177 lb.; Creole, \$4·25 to \$4·50 per bag (ex store).

SPLIT PEAS—\$5·85 to \$5·90 per bag (210 lb.).

TANNIAs—\$1·92 per barrel.

YAMS—White, \$1·92; Buck, \$2·40 per bag.

SUGAR—Dark crystals, \$2·00 to \$2·10; Yellow, \$2·40 to \$2·50; White, \$3·50 to \$3·60; Molasses, \$1·80 to \$1·90 per 100 lb. (retail).

TIMBER—Greenheart, 32c. to 55c. per cubic foot.

WALLABA SHINGLES—\$3·00, \$3·75, and \$5·25 per M.

Trinidad,—May 18, 1906.—Messrs. GORDON, GRANT & Co.; and Messrs. EDGAR TRIPP & Co., May 19, 1906.

CACAO—Ordinary to good red, \$11·50 to \$11·75; estates, \$12·00 to \$12·25 per fanega (110 lb.); Venezuelan, \$12·75 to \$13·00 per fanega.

COCOA-NUTS—\$20·00 per M., f.o.b.

COCOA-NUT OIL—65c. per Imperial gallon (casks included).

COPRA—\$3·25 to \$3·40 per 100 lb.

DHAL—\$4·50 to \$4·70 per 2-bushel bag.

MOLASSES—18c. per gallon.

ONIONS—\$3·00 per 100 lb. (retail).

POTATOS, ENGLISH—\$1·30 to \$1·50 per 100 lb.

RICE—Yellow, \$4·60 to \$5·00; White, \$4·80 to \$6·00 per bag.

SPLIT PEAS—\$5·00 to \$5·75 per bag.

SUGAR—Yellow crystals, \$2·00 to \$2·25; molasses, \$1·90 to \$2·00 per 100 lb.



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Canning Pine-apples.

AN essential requirement for carrying on a remunerative export trade in fresh pine-apples is that there should be an absolutely regular steamship communication between the producing country and the nearest market. Any long interval between the shipments when the crop is ripening would mean that a large quantity of fruits

would be thrown on the hands of the grower, of which he might not be able to dispose. When such difficulties arise, the possibilities of a canning factory naturally come up for consideration.

For some years a considerable trade has been carried on at Antigua in the shipment of fresh pine-apples. Thus, in the year 1902-3, 4,754 barrels and 47 crates, of the value of £2,280, were exported. The trade has not been a remunerative one and is in danger of extinction. Recently, it has been suggested that a small factory might possibly be erected in the island for preserving and canning pine-apples.

In order that a factory of suitable size could be successfully operated, it would be absolutely essential that a considerable area should be established in pine-apples. Further, such a factory could not be run without a regular supply of fruit exactly suited for the purpose. Large canneries use from 25,000 to 50,000 pine-apples a day. It is suggested that a factory need not necessarily confine itself to pine-apples. Smaller factories that put up other fruit during the year would doubtless be able to take care of the supply of small pine-apples or those which, for any reason, could not be shipped in the fresh state. It is considered that the establishment of canning factories on a large scale would be opportune only where there is a fairly abundant supply of cheap labour.

There is no doubt that, where a good market exists for the fresh fruit, it would be desirable that only the smaller fruits, which could not be profitably exported, should be retained for preserving purposes. The prices that a factory could offer for fruit of this class would be

nominal; probably not more than, if as much as, the growers obtain at present, but the latter would have a steady market and a certainty of disposing of all their fruit as it ripened. The canneries of the large sea-port cities of the United States are able to pay only the lowest price, so that they are obliged to use small fruit or that from an over-stocked market.

The canning of pine-apples is operated on a large scale in Florida, Australia, the Straits Settlements, and, of late years, also in the Hawaiian Islands and the Bahamas. It would be necessary, in the event of an attempt being made in the West Indies to establish a similar industry, to enter into competition with those countries. It is probable that the success of this industry in the Straits Settlements, whence no fewer than 448,000 cases of preserved pine-apples (valued at close on £521,000) were exported in 1904, has been largely due to the advantage conferred by an abundant supply of cheap Chinese labour. In the Hawaiian Islands four canneries are working. The output in 1904 was some 20,000 cases, each containing twenty-four cans; the following year the output was estimated at 65,000 cases.

It may be of interest to review briefly the progress which has been made in this connexion in the nearest British colony, viz., the Bahamas. About ten years ago factories for the canning of pine-apples were established at Nassau and Eleuthera. In 1897 more than 20,000 cases of preserved pine-apples were exported. Three years later, the number had risen to close on 42,000, of the value of £8,836. The highest figure was reached in 1902-3, when 47,892 cases were exported, their value being £9,515. The canning industry has now largely superseded the export of fresh fruit. The popular fruit for canning purposes in the Bahamas is that known as the Red Spanish. This is a medium-sized to small fruit, of somewhat variable shape, and of a reddish-yellow colour. It is a hardy sort with a moderately good flavour, a prolific cropper, ripening early. The Red Spanish is the variety most extensively grown in the United States, where it may be considered the standard variety for field culture.

The process of canning is not complicated, although experience is, of course, necessary for successful work. The first operation is the removal of the rind; this is done by hand. Then the core is extracted; after which the fruit is cut into discs, which are fitted into tins of corresponding size. The size of the cans and the concentration of the syrup depend upon the market that is to be supplied. In the Straits Settlements, the peeled and cored fruit having been placed in the tins,

syrup is added, which is made up of one part of sugar to thirty-three parts of water. After the tin has been soldered, it is placed for some time in a steam-heated tank. The tin is then removed from the boiling water, and a hole punched in its top to let out the steam; after which the tins are re-soldered and again plunged into hot water.

A writer in the *Hawaiian Forester and Agriculturist* (December 1904) recommends that no pine-apple should be gathered for canning until it is ripe enough to be eaten fresh, and adds: 'nothing but its own juice should be used for syrup, no matter what anybody may say to the contrary; this will pay in the long run.' A shipment of canned pine-apples, by a company of which this writer was manager, realized \$2.35 per dozen cases, of 2½ lb. each, ex ship at San Francisco. There appears to be a large sale for this product, especially in the United States.

With the view of affording information in regard to canning pine-apples, the Imperial Department of Agriculture has brought together facts and figures which might be published later in pamphlet form. In the meanwhile, it would be useful if fuller details could be obtained of the industry as carried on in the Bahamas and the Straits Settlements, and more could be learned of the essential points upon which success depends.

SUGAR INDUSTRY.

The Bourbon Cane.

The following is extracted from an article in the *Louisiana Planter*, of May 5, entitled 'The Passing of the Bourbon Cane':—

The Bourbon sugar-cane, the foundation of the West Indian sugar industry and the great favourite there in old times, has fallen into disfavour of recent years, its easy injury by parasitic attacks being the cause. In fact, much of the impetus given to the investigation of seedling canes has come from the failure of the old Bourbon to resist disease and from the desire to secure there new varieties, capable of a higher degree of resistance.

In British Guiana careful investigations have been made recently in regard to the Bourbon cane, and Mr. R. Ward, the Agricultural Assistant, studying the fungus diseases on the plantations in Essequibo, and the Government Botanist, Mr. A. W. Bartlett, recently made an extensive report upon the Bourbon canes there, in which they indicate the severe attacks of the root disease upon the Bourbon varieties, while the new seedlings, in adjacent plots, under precisely similar conditions, remained green and healthy and gave promise of satisfactory yields where the Bourbon cane seemed to be dying out. Professor Harrison, the well-known authority in such matters, believes that the only effectual remedy for this deterioration in the Bourbon cane is to abandon that variety and to replace it with more resistant seedlings.

Sugar Production in Java.

The Secretary of State for the Colonies has forwarded to the Imperial Commissioner of Agriculture the following papers on the subject of sugar production in Java, which are published for general information:—

The Colonial Office—to the Foreign Office.

Downing Street, March 31, 1906.

Sir,—I am directed by the Earl of Elgin to acknowledge the receipt of your letter of the 20th. instant (9,061) enclosing a copy of a memorandum by Mr. Seymour Bell, communicated by His Majesty's Consul-General at New York, on Cuban sugar.

Lord Elgin's attention has been drawn to Mr. Bell's observations at the end of his memorandum, as to the exceptionally successful competition of Java sugar in the United States, while he is also aware that the imports of Java sugar into this country have increased from 22,463 tons in 1903 to 93,453 tons in 1904, and to 118,899 tons in 1905, and his Lordship would be glad of any information which may be obtainable through His Majesty's Consuls in Java as to the sugar manufacture in that island, the quality of cane planted, the cost of production and manufacture, etc., which may account for its apparent superiority, and which might be of use to the Imperial Commissioner of Agriculture in the West Indies, and to the Governments of the British sugar-producing colonies.

I am, etc.,

(Sgd.) C. P. LUCAS.

Memorandum by Mr. S. Bell, British Commercial Agent, British Consulate, New York.

New York, March 5, 1906.

The New York *Daily Tribune* of to day's date quotes an article in a recent issue of the *Cuba Review and Bulletin*, written by Messrs. Willett and Gray, of New York, sugar statisticians, which shows the benefits which have accrued to the Cuban sugar growers through the reciprocity treaty with the United States. It is estimated that the Cuban sugar crop for 1906 will reach 1,400,000 tons.

The article of Messrs. Willett and Gray, in part, follows:—

'A crisis seems to await Cuba in its sugar interests within the next three or four years. The prosperity which came from the reciprocity treaty with the United States is not likely to last much beyond that time. Steadily and more rapidly events are moving toward this end. To retain the market of the United States for its entire product, Cuba must soon give away its entire advantage under the reciprocity treaty. The annual increase in the production of sugar which pays less duty than Cuban in the United States will cause this result.

'Already, during the year 1905, Cuba came into such close contact with sugars of foreign countries which pay full Dingley rates of duty in the United States that, in order to compete and sell the entire production of her island, she was compelled to undersell the beet-root sugar markets of Europe to the extent of 13c. per 100 lb., which 13c. came out of the 34c. per 100 lb. allowed her by the Reciprocity Bill.

'Only by this concession she reduced the imports of European beet sugar into the United States to less than 25,000 tons in 1905. The consumption of all sugar in the United States in 1905, which paid the full duty rates, was only 438,383 tons, against 645,733 tons in 1904. The consumption of foreign sugar paying full duties in 1906 should be further reduced to 223,295 tons, according to the

estimate of crops for the year which receive advantages under our tariff. At the present rate of increase of such crops, the year 1908 should show an end of importation of foreign sugar paying the full duty rates. What will happen then? Consumption rises only at the rate of about 5 per cent. per annum, while sugar production of favoured interests rises at a much faster rate. The country paying the highest rate of duty will be the first to feel the effects of over-production of favoured sugars. The Cuban reciprocity treaty ends on December 27, 1908, and, whether renewed or not, Cuba will begin to be shut out of the United States market for some portion at least of her crop, by the increased production of non-duty-paying sugars of Porto Rico, Hawaii, domestic cane and domestic beet sugars, and the lesser paying duties of the Philippine Islands. Under special favouritism the crops of Porto Rico have increased in eight years from 54,000 tons in 1898, to 210,000 tons in 1906. Hawaiian crops, under reciprocity in 1876 to 1,900, and free trade since, have increased from 10,000 tons in 1876, to 391,062 tons in 1902, and to 370,000 tons in 1906. Domestic beet sugar crops have increased from 12,018 tons in 1893, to 285,000 tons in 1906. The Philippine Islands crops, which were reduced to 55,000 tons in 1901 by the plague of rinderpest, which destroyed the caribou or cattle used for field work, a temporary affliction not requiring special legislation for all time to remedy, will produce 125,000 tons of sugar in 1906.

'The production in 1906 of all these sugar industries protected from competition to the extent of their production, leaves but 223,295 tons of foreign full-duty-paying sugar required for the consumption of the United States in 1906, allowing about 5 per cent. normal average increase of consumption over 1905. In confirmation of the steady and more rapid trend of the encroachment of competition between the present protected sugar interests, we call attention to the decrease in the amounts of full-duty-paying foreign sugars which have gone into consumption in the United States in recent years. In 1899 we used 632,920 tons of European beet sugar against 24,005 tons in 1905; in 1902 we used 258,418 tons of West India sugar, other than Cuba and Porto Rico, against 96,141 tons in 1905. In 1901 we used 141,998 tons of Brazil sugar against 21,333 tons in 1905. In 1900 we used 351,952 tons of Java sugar, against 397,905 tons in 1904, and 353,916 tons in 1905. Java has thus far held its own against competition better than any other full-duty-paying country, but it can hope to do so only a little longer.'

(Sgd.) E. SEYMOUR BELL,

British Commercial Agent.

The Foreign Office—to the Colonial Office.

Foreign Office,

April 5, 1906.

Sir,—I am directed by Secretary Sir E. Grey to acknowledge the receipt of your letter 9,706/1906 of the 31st. ultimo, asking to be supplied with a report on the condition of the sugar industry in Java. A certain amount of information on the subject will be found in the Consular Report on Java for the year 1904, a copy of which is enclosed, herewith,* but His Majesty's Consul at Batavia will be instructed to send home a report with the full details required by the Earl of Elgin.

I am, etc.,

(Sgd.) E. GORST.

* The extract forwarded has already appeared in the *Agricultural News*, Vol. IV, p. 227. [Ed. A.N.]



WEST INDIAN FRUIT.

CITRUS FRUIT GROWING.

In *Farmers' Bulletin* No. 238 (U. S. Department of Agriculture) full information is furnished in regard to the methods employed in growing oranges and other citrus fruits, which will be of service, it is believed, to many prospective citrus growers, and to very many planters now engaged in the industry.

The following extracts have been selected from this bulletin with a special view to their application to conditions in the West Indies and their usefulness to growers here:—

The growing of the finest citrus fruits is a horticultural accomplishment not surpassed in any line of the art. There are very few agricultural occupations that require an equal amount of judgement, and very few that give as remunerative a return for the mental outlay.

The production of the finest oranges requires years of most careful study and as diligent attention as the most intricate business operation. Unless the citrus grower is in full sympathy with his surroundings and in love with his work, he will as surely fail to produce the best results as would be the case in any other occupation.

The ideal climate for citrus growing is one in which the rainfall occurs after the fruit has been shipped and before the new crop begins to ripen. The rainfall should not be excessive, certainly not more than 50 to 70 inches annually, and the winter temperature should not go below 26° to 27° F. of continued cold, though a lower temperature may be withstood for an hour or more without killing the trees.

Varieties of citrus grow upon the sticky, adobe soils of Mesopotamia, upon the alluvial soils of the lower Mississippi, upon the fertile soils of the West India Islands, upon the dry soils of Arizona and California, and upon the poor, sandy soils of Florida. There is probably no other genus of fruit trees in which the species are so plastic as to adapt themselves to almost every possible gradation of soil. It should not be inferred, however, that every variety of the genus can be grown upon all of these different kinds of soil, for it is absolutely necessary to choose the particular variety which is adapted to any peculiar soil.

In all sections a soil must be chosen that is not underlain with a heavy substratum known as 'hard-pan.' The land should be elevated sufficiently to permit free drainage, and, in the sections where irrigation must be practised, should be so located that water can be easily supplied.

After determining that the desirable features specified

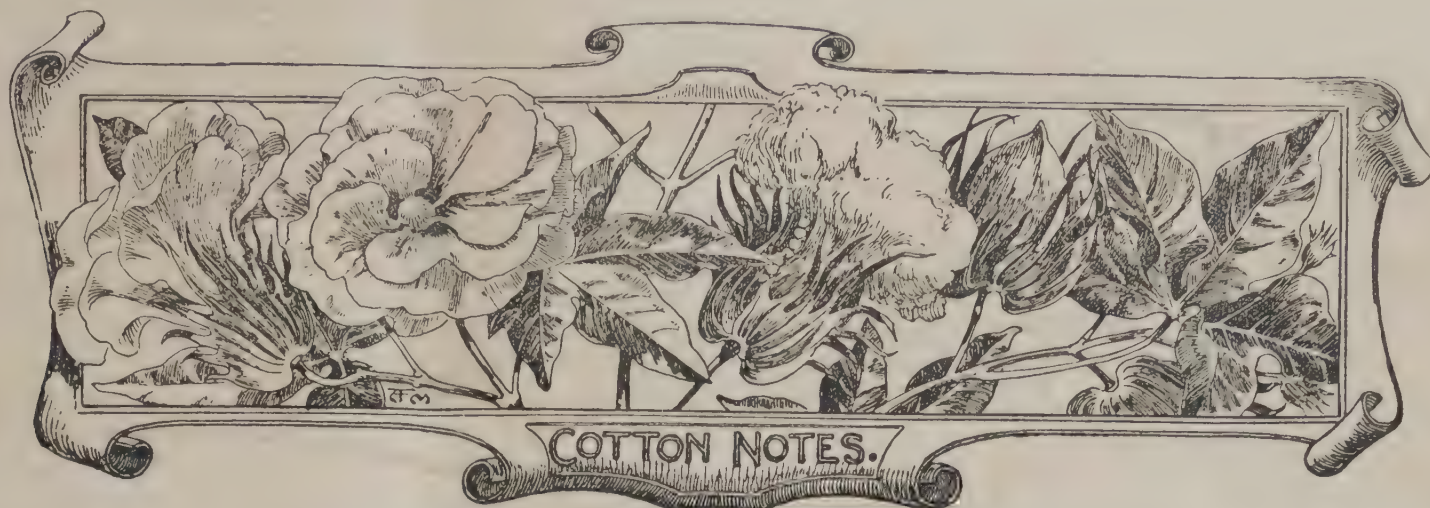
are to be found in the location under consideration, it is very important to see that the land is well protected from the occasional frosts which visit the citrus-growing sections. In the West Indies and the southernmost parts of Florida this factor does not enter into consideration. In fact, it seems that those places in the West Indies which are subjected to the lowest winter temperature produce citrus fruits of the highest excellence. The temperature in the vicinity of Mandeville, Jamaica, is said to go as low as into the fifties during winter nights, and yet this is probably the best citrus fruit section in the island.

A location chosen so as to combine all the qualifications already mentioned may still be undesirable if it is exposed to the force of high winds, which may occur in any portion of the country. It is quite impossible to protect a grove against tropical hurricanes, but the more common high winds of annual occurrence must be considered. They carry off the moisture, and bring with them a dry, parching air which is injurious to citrus trees; and they are also very likely to cause 'thorning' or to mutilate the fruit in other ways. Sometimes it becomes necessary to erect artificial wind-breaks for protecting a grove not well located. These artificial wind-breaks may later be supplanted by some natural growth that can withstand the force of the wind.

The amount of rainfall needed to produce a crop of citrus fruit depends on various factors; prominent among them are character of soil and humidity of atmosphere. Where there is a deficiency of moisture it may be supplied by irrigation, but a superabundance of moisture can be controlled only in a measure by drainage. In the humid portions of the United States, and in the rainy sections of the West Indies, heavy rainfalls frequently occur at the time when the fruit should be marketed or when the trees should be dormant preparatory to blooming. As these conditions cannot be corrected, citrus orchards should never be planted in regions where fall or winter rains are prevalent. This is especially true of the rainy side of most islands in the West Indian group.

Citrus growing throughout the West Indies is in a rather formative state. The efforts at systematic work in this line have not been carried forward with the same degree of vigour as in California and Florida. Nearly all the varieties recommended for south Florida may be planted with more or less confidence in this region.

This bulletin also contains detailed directions with regard to cultivation, budding, etc., and deals fully with such matters as picking, grading, and shipping.



COTTON IN ST. KITT'S.

In further reference to the results obtained from a field of cotton on Conaree estate in St. Kitt's (see *Agricultural News*, Vol. V, p. 87), Mr. F. R. Shepherd, Agricultural Superintendent, writes as follows under date April 24:—

The prices received by last mail have been very satisfactory. Cotton from Conaree estate, which gave the large return of 350 lb. of lint per acre, sold for 1s. 4d. per lb., and Canada cotton brought 1s. 3d. per lb. This last was not sold by the British Cotton-growing Association, and it seems as if the cotton shipped to the association invariably brings a higher price.

It will be seen that this field of 12 acres has yielded a gross return of £215 5s., or at the rate of £17 18s. 9d. per acre.

ST. VINCENT COTTON INDUSTRY.

Mr. W. N. Sands, Agricultural Superintendent at St. Vincent, has forwarded the following, in continuation of previous notes published in the *Agricultural News*, on the cotton industry in that island:—

Ginning was finished at the central cotton factory and the total number of pounds of lint dealt with amounted to 121,174, or nearly 337 bales, which, with small lots not dealt with at the factory, would bring the total up to about 338 bales. Although this yield does not work out at $\frac{1}{2}$ bale an acre all round, the actual yield was much larger, and had there been a sufficient supply of labour during the picking season, the yield, in the opinion of planters, would easily have worked out at over 200 lb. of lint per acre. On one estate alone it is estimated that seed-cotton equal to 10 bales of lint was lost from this cause.

WEST INDIAN SEA ISLAND COTTON.

The following information, relative to sales of West Indian cotton, is extracted from a letter, dated May 1, addressed by Messrs. Wolstenholme & Holland, of Liverpool, to the Imperial Commissioner of Agriculture:—

Since our last report a good business has been done in West Indian Sea Island cotton at steady prices.

The sales include: Nevis, 14d. to 15d.; Anguilla, 14½d. to 16d.; Montserrat, 14d. to 15½d.; St. Kitt's, 15d. to 17d.; Antigua, 14½d. to 18d.; and Barbados, 15½d. to 17d.

There is an indisposition to pay over 16d. for 'fine,' as users have sufficient stock to last them for several months. There is, however, a limited demand for really 'extra fine' at 18d. to 19d. For common qualities, 12d. to 14d., there

is a large inquiry, but we have hopes of obtaining 14d. to 15d. for these sorts, for a while at any rate.

Writing a fortnight later, Messrs. Wolstenholme & Holland report:—

Our last report was dated the 1st. instant: since which date fair sales of West Indian Sea Island cotton have taken place, including Nevis, 13½d. to 15½d.; St. Kitt's, 15d. to 16½d.; Anguilla, 16d.; Barbados, 16d. to 17d.; and St. Vincent, 15d. to 20d.

Buyers having good supplies on hand are not disposed to add to their stocks, except at some concession in price.

Qualities between 13d. to 14d. are readily saleable, and there is an indisposition to pay over 15d. except for 'extra fine' St. Vincent up to 18d. to 19d.

EMPIRE-GROWN COTTON.

In the House of Commons on May 2, the Under-Secretary of State for the Colonies stated:—

In 1902 the amount of cotton exported from British colonies to the United Kingdom comprised only 827 bales of the value of £4,742. In 1904 the amount had risen to 9,438 bales of a value of £52,026; while the amount exported to all other countries, which in 1902 was 2,093 bales, of a value of £11,467, rose in 1904 to 12,037 bales of a value of £61,475. The figures for 1905 were not yet complete. The amount of cotton grown under the auspices of the British Cotton-growing Association was, in 1903, approximately estimated at 1,900 bales of a value of £29,000; in 1904 this had risen to 6,000 bales of a value of £80,000; and in 1905 to 14,200 bales of a value of £190,000. The estimate for 1905 far surpassed all previous records, and the total crop was computed at 20,000 bales of a value of £330,000. He thought these figures, which exceeded an arithmetical progression, were highly remarkable and encouraging, especially considering the brief period during which the experiment had been made. The multiplication of the sources of cotton supply could not fail, in the course of time, by averaging climatic risks, and consequently preventing unusual shortages, to exercise a steadying influence upon cotton prices, with a resulting restraint upon cotton gambling. The Secretary of State was warmly interested in the work of the British Cotton-growing Association. The policy initiated under the late Administration would be maintained and, he trusted, pursued. The Government was in cordial co-operation with the association in the furtherance of its work, both by means of monthly conferences held at the Colonial Office with representatives of its council, and through the assistance which was being given to its objects by the Imperial Department of Agriculture in the West Indies, and by the Governments of African colonies and dependencies. (*Cheers.*)

CONFERENCE OF COTTON GROWERS AT BARBADOS. (CONTINUED.)

Insect Pests of Cotton and Methods for their Control.

Mr. F. A. Stockdale read the following paper on behalf of Mr. H. A. Ballou, B.Sc., Entomologist on the staff of the Imperial Department of Agriculture, at present in the United States:—

COTTON WORM.

This important pest of cotton can be controlled only by the exercise of sufficient care. A sharp lookout must be kept for its first appearance and poison used promptly. Paris green and lime have given good results both in controlling the pest and as an economical poison. The method in vogue is the use of Paris green and lime at the rate of 1 lb. of Paris green to 6 lb. of lime, or, when measured, 1 part of Paris green to 12 parts of lime. Paris green may be used without lime, and it should not require more when used this way than when used with lime. About 1 lb. of Paris green per acre for each application is sufficient to kill the worms. The point to be observed is an equal application over the plants. The cost of the Paris green and lime and of the labour for applying has been placed at about 2s. per acre for the entire season; but when carelessly applied with oat sacks and tin shakers and things of that sort, the cost has been as high as 8s. to 10s. per acre. This is far too much. The cost this year will be a trifle more on account of the high price of all arsenicals. The Acme Powder Bellows, which was described in the *Agricultural News*, Vol V, p. 154, is sold in the United States retail at 75c. each. This has been used in the Sea Islands during the past season with very satisfactory results. It is obtainable from Messrs. Gillespie Bros. & Co., 4, Stone Street, New York, at about \$3.00 per dozen, not including packing and freight. It is a simple machine and should be economical and save time in application. It will work better when the poison is used without lime.

Too much stress cannot be placed on careful supervision as to the appearance of the worm and the use of poisons on the plants. Green arsenoid will probably prove a good substitute for Paris green, and it is expected will be slightly cheaper. It is lighter than Paris green and will probably go further in application. Arsenate of lead is expensive to apply, because it must be spread, and it is slow in its action. It adheres to the leaves very well and does not burn.

Experiments with the different poisons will be carried out during the coming season.

CUT WORM.

The cut worm has been a pest in some places during the past year. It attacks the young plants when they first come up. It may be controlled by the use of a poisoned bait made by adding 1 lb. Paris green to 50 lb. bran, mixed to a mash with molasses and water. This is applied at the time of planting the seed, a small quantity being put in each hole or on the surface of the ground where cotton is to be planted. Both methods have been tried with satisfactory results.

SCALE INSECTS.

These pests have caused some loss to the cotton growers during this past year, chiefly on estates where old and scale-infested cotton from the previous season had been allowed to stand over until after the new crop had started.

This will not often happen *if the old plants are taken out at the end of the season and before the new crop is planted*. The same is true in a general way of the red maggot, which has also been a pest on some estates this last season. Great care should be exercised not to injure the plants by hoeing, as every wound in a plant offers an additional opening for attack by this insect. If scale insects and the red maggot attack cotton while it is still quite young, it will probably be best to cut out or pull out the infested plants; but if the attack begins after the plants are well grown, it may be desirable to get as much cotton as possible from the plants before taking them out.

The leaf-blister mite does not occur in Barbados at present. The cotton stainer is very rare and is not a pest.

Fungoid Diseases of Cotton and their Treatment.

The following paper, on the Fungoid Diseases of Cotton and their Treatment, was read by Mr. F. A. Stockdale, B.A., Mycologist on the staff of the Imperial Department of Agriculture:—

Up to the present time the fungoid diseases of cotton in Barbados have not proved to be serious, but, when the area under cotton is increased, it is possible that they will assume a greater importance unless constant watchfulness is practised and remedial measures are promptly applied.

Many diseases of cotton are due to unfavourable conditions, while many others spread rapidly when the conditions are such that the cotton plant is not in a vigorous state of growth. Considerable care should, therefore, be given to the situation, soil, cultivation, etc., so that the conditions are made as favourable as possible to the growth of the cotton plants, and consequently, unfavourable to the spread of diseases.

ANTHRACNOSE.

In Barbados this disease has been noticed in almost every field to a greater or less extent.

Without doubt, it causes some damage to cotton in certain parts of the island. It has been known to cause a loss of 10 to 15 per cent. of the total crop in some cotton districts of the United States, and therefore planters should endeavour to keep it in check, so as not to incur the losses experienced elsewhere.

With reference to the remedial measures to prevent the spread of the disease, all diseased bolls from the ground, and all old cotton left standing with diseased bolls attached after all the crop has been gathered should be collected and *burned*. Old plants have been noticed that have been left standing with numbers of diseased and worthless bolls attached that should have been got rid of long before.

It is also important that all seed used for planting purposes should be *disinfected*. If this is not done spores attached to the seed may cause disease on the 'seed-leaves' or cotyledons, which may result in great loss in a crop. It is estimated that 1 gallon of solution of corrosive sublimate (1 in 1,000) should be sufficient to disinfect 12 lb. of seed at a cost of a little more than 1c.

MILDEW.

This disease is fairly general in Barbados, and is usually to be noticed as a white felt on the under surface

of the older leaves. Sometimes it is noticed on both surfaces and sometimes on the younger leaves. It is said to do very little harm, but experiments will be conducted this year to endeavour to keep it in check.

RUST.

This disease makes its appearance as reddish pustules on the under surfaces of leaves. It has not done much damage up to the present, and if at all prevalent, could probably be kept in check by dusting with a mixture of sulphur and lime. Other fungoid diseases occur, but, at present, do not cause much damage. Planters, as soon as they notice any signs of disease in their fields, are advised promptly to forward specimens to the Imperial Department of Agriculture, where they will be investigated and reports made, together with suggestions for remedial measures.

Conclusion of the Conference.

In moving a resolution of thanks to the Imperial Department of Agriculture for its assistance in connexion with the establishment of the cotton industry, Mr. C. J. Greenidge, M.C.P., made the following remarks:—

Before we separate I should like to move a vote of thanks to Sir Daniel Morris, and in doing so I beg to submit the following resolution:—

‘That this meeting of cotton growers desires to place on record its thanks to Sir Daniel Morris and the members of the staff of the Imperial Department of Agriculture for their energy and perseverance in introducing the cultivation of Sea Island cotton into this island which has now become an alternative industry.’

Most of you remember that in 1893 or 1894, when the crop of canes was being destroyed by fungoid diseases, we were told from across the waters: ‘You ought to have an alternative industry.’ Everybody looked round and thought it nonsense. I for one thought so. But, through the energy and tact displayed by Sir Daniel Morris and his staff of workers, we have to-day an alternative and paying industry, and I beg to propose a vote of thanks to them. (*Cheers.*)

Dr. C. E. Gooding, M.C.P., in seconding the vote, said:—

I am very pleased indeed to have been asked by Mr. Greenidge to second this vote of thanks. As I have said before now, had it not been for Sir Daniel Morris and his staff, the cotton industry of Barbados, if anywhere at all, would have been in its infancy; whereas we certainly have had a ten-years’ start, and are in a position to-day with regard to the industry which it would otherwise have taken individual effort many years to attain.

The resolution was passed unanimously.

SLAVE-GROWN CACAO.

Since the appearance of Mr. Nevinson’s articles on the Portuguese slave trade in Africa, which were published a few months back in *Harper’s Magazine*, one of the great American cacao manufacturers has written to him to say that in consequence of the article he has stopped the importation of San Thomé cacao. Will British manufacturers not follow suit? *Tropical Life* gives the shipments into Great Britain for the first three months of the present year as 99,346 from San Thomé, as against 153,447 bags from the British West Indies. (*West India Committee Circular.*)

CASSAVA TRIALS AT JAMAICA.

In previous issues of the *Agricultural News* (Vol. IV, pp. 269 and 361), some of the results of varietal experiments with cassava in Jamaica have been published. These dealt with the results after twelve and fifteen months’ growth, respectively. The *Bulletin of the Department of Agriculture*, for April, contains the final results of tonnage and starch yields per acre after twenty-one months. The following is extracted from the report:—

‘White Top’ proved the best variety for harvesting at twelve months, with a yield of 10·5 tons tubers, containing 7,902 lb. starch per acre. Next came ‘Long Leaf Blue Bud’ with 9·0 tons tubers, followed by ‘Blue Top’ with 8¼ tons per acre. ‘Smalling’ was fourth, closely followed by ‘Rodney’ and ‘Luana Sweet.’

‘White Top’ fell off after twelve months’ growth, and is clearly a variety that does not improve by a longer period of growth than a year. At fifteen months, ‘Long Leaf Blue Bud’ proved to be the most prolific variety, yielding 15·4 tons of tubers with 4,955 lb. starch per acre. ‘Smalling,’ ‘Mullings,’ and ‘Luana Bitter’ followed in the order named.

‘Blue Top’ is the champion cassava for harvesting at twenty-one months, having given 21·9 tons of tubers and over 7 tons of starch per acre (15,818 lb.).

This result would have been considered fabulous previous to this careful series of field trials, and it is claimed that we have now proved that cassava can be grown without irrigation in the plain of Liguanea, in Jamaica, to give a yield of starch greater than has ever been recorded before of any starch-producing plant.

It is true that this crop has taken the plant practically two years to produce, but when we remember the cheapness of land and the low cost of cultivation involved in the prolonged period of growth, it is abundantly clear that the cost of increasing the starch yield from 3½ to 7 tons per acre is out of all proportion to the value of the increased product.

It would appear, therefore, that the most economic production of starch would be attained by the cultivation of such a variety as ‘Blue Top’ upon a biennial basis. For quick returns ‘White Top’ would be the better variety, and in starting a starch factory it would be advisable to grow half the cassava area as an annual, and half as a biennial crop.

CONCLUSIONS.

1. Under conditions obtaining at Hope and without irrigation, a yield of 10½ tons tubers at twelve months, of 15½ tons at fifteen months, and of nearly 22 tons tubers per acre at twenty-one months has been recorded.

2. The indicated yield of starch per acre has risen from 3½ tons at twelve months to 5½ tons at fifteen months, and 7¼ tons starch at twenty-one months’ growth.

3. This yield has been obtained at a cost of about £5 per acre, and it is abundantly clear that we can produce enormous crops of cassava in Jamaica at a cost that should enable us to replace potato starch in the British market.

4. Cassava can be grown to give a large yield upon a soil and with a rainfall that would not give good crops of sugar-cane without irrigation. Large areas of land, at present producing little or nothing, could be profitably used for the growth of cassava for starch manufacture. This is an industry that can be confidently recommended to capitalists and land owners as one of the most promising means of increasing our exportable produce without trenching upon land at present productive of other paying crops.

EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming, should be addressed to the Commissioner, Imperial Department of Agriculture, Barbados.

All applications for copies of the 'Agricultural News' should be addressed to the Agents, and not to the Department.

Local Agents: Messrs. Bowen & Sons, Bridgetown, Barbados. *London Agents:* Messrs. Dulau & Co., 37, Soho Square, W., and The West India Committee, 15, Seething Lane, E.C. A complete list of Agents will be found on page 3 of the cover.

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NOTES AND COMMENTS.

Contents of Present Issue.

The Editorial of this issue of the *Agricultural News* deals with the subject of canning pine-apples. Considerable progress has been made in establishing a canning industry in the Bahamas.

Interesting information in relation to the sugar market in the United States is contained in the papers published on p. 179.

Brief notes of interest to cotton growers will be found on p. 181. On pp. 182-3 are published two other papers read at the recent conference of cotton growers at Barbados (see *Agricultural News*, Vol. V, pp. 164-7). These relate to the insect and fungoid pests of cotton and the methods for their control. The conference concluded with a vote of thanks to the Imperial Department of Agriculture (p. 183).

On p. 186 is published the first part of a pamphlet issued by the Colonial Office dealing with yellow fever. It sets forth very clearly a number of facts in relation to mosquitos and yellow fever that should be known by all. With this knowledge the suppression of yellow fever becomes simple and practicable.

On p. 191 Mr. Jackson's usual monthly report on the London drug and spice market appears. This is followed by a brief summary of recent experiments with a new fertilizer known as 'lime nitrogen,' which contains atmospheric nitrogen brought into a state of combination.

Troublesome Birds.

A correspondent has written to the *Jamaica Gleaner* on the subject of the destruction of eggs and young birds by the magpies and other birds. The same offence is committed by the 'John Crow' and the 'Ting-Ting.' At the same time it is suggested that scorpions and centipedes are kept in check by the magpies and the 'Ting-Ting.'

It may be of interest to mention that at Grenada, during this season, the black-bird is said to have taken to destroying young birds in their nests on a large scale. This is probably on account of their being hard pressed in consequence of the continued dry weather.

Exports of Barbados.

The total value of the exports of Barbados during the year 1905 was £696,829, showing an increase of £69,151 over the previous year. This increase was made up as follows: sugar, £11,283; molasses, £33,010; cotton, £7,618; other products, £17,241.

In the Report on the Customs Department for the year, it is stated: 'The reports of minor products of the colony have increased considerably. In 1903 they were £23,456; last year they reached £68,037. The steady development of these industries is, no doubt, due to the work of the Imperial Department of Agriculture.'

Considerable increases are shown by bananas, cotton, fresh fruit and vegetables, and manjak.

The exports of the staple products of the colony—sugar, molasses, and rum—were of the value of £646,003, as against £594,144 in the previous year.

Punjab Goats for the West Indies.

In May last year, at the request of the Imperial Commissioner of Agriculture, two male Punjab goats were obtained by the Trinidad Government Emigration Agent at Calcutta and shipped for New York *en route* for Barbados. Unfortunately, both animals died on the voyage, one at Port Said and the other at Gibraltar.

As Indian goats are remarkable for their size and excellent milking properties, it was considered that they would be likely to prove of much value in improving the local breeds of goats in the West Indies. A second attempt to import Punjab goats has accordingly been made.

With the assistance of the Civil Veterinary Department at Lahore, two goats, considerably younger than those shipped last year, were specially selected. These were shipped from Calcutta on March 29 last for New York. They arrived there safely and were re-shipped in S.S. 'Parima' for Barbados. The animals, which are quiet and tractable, were safely landed on the 4th. instant and will remain at Barbados for the present.

Agriculture in the Leeward Islands.

The *Blue Book* on the Leeward Islands for 1904-5, just issued, contains a review of the agricultural improvements during the year.

After a reference to the establishment of the two central sugar factories in Antigua, it is stated that the operation of the contract entered into by the owners of certain muscovado sugar estates in Nevis to purchase canes from the peasantry on a sliding scale had proved very beneficial. 'The experiments with varieties of sugar-cane, conducted by the Imperial Department of Agriculture, are watched with interest and participated in by the planters.'

The assistance offered by the Imperial Department of Agriculture in connexion with the cotton industry, together with the enterprise of growers, had enabled a real and business-like attempt to be made to produce cotton of the first quality.

In Dominica, the cultivation of limes and cacao was steadily increasing, and a growing trade in fresh fruit, particularly oranges and limes, was springing up. 'The exports of the island, which is now in a flourishing condition, are steadily growing.'

In Montserrat the lime industry was once more established, while the cotton industry had been taken up in the Virgin Islands.

Sugar-cane Experiments in Jamaica.

A report by Mr. H. H. Cousins, M.A., F.C.S., Island Chemist, on the work of the Sugar Experiment Station in Jamaica for the year 1905, has recently been issued. The report is divided into five parts as follows: (i) Manurial experiments on estates; (ii) varietal experiments on estates; (iii) selection and trial of seedling canes at the central station; (iv) distillery experiments; (v) report by the Fermentation Chemist on the manufacture of Jamaica rum.

For the season 1904-5 manurial experiments were conducted on six estates with plant canes and on two estates with ratoon canes.

With regard to the varietal trials on estates, it is mentioned that only two estates were able to carry on experiments, but during the coming season this work is to be largely extended. The selection and trials of seedlings at the central station will be dealt with in a future issue of the *Agricultural News*. Some interesting results have been obtained.

While it is not suggested that any sweeping generalizations should be drawn from the preliminary distillery experiments, which are only in their first season, the records are likely to be of interest to all connected with this branch of the sugar industry.

In the last section of this report the Fermentation Chemist gives the results of his personal experience in the distilleries and his observations upon the types of micro-organisms which he has found to be at work.

It may be mentioned that the Sugar Experiment Station was established in consequence of the passing of a special law in 1903, by which the Legislature appropriated the Imperial Grant-in-aid of the sugar industry amounting to £10,000.

Exports of Ceylon.

In a review of the colony's trade, in the *Annual Report* for 1904, it is stated that the products of the cocoa-nut palm represent nearly 25 per cent. of the export of Ceylon produce. The total value of the exports of such products during the year was £1,627,260. There was a decrease in the export of oil and poonac, but cocoa-nuts and copra show an increase. There is reported to have been a very large extension of cocoa-nut plantations in the North-Western Province. The export of tea (158,000,000 lb.) is the largest yet recorded; but the value has decreased. This is due to the fall in value of Ceylon tea in the British market. It is believed that the future is more hopeful on account of the successful exploitation of new markets and the consequent relief in the strain on the home market.

The value of the cacao exports increased during the year, but the price was lower than in 1903. The main cause of the low value of the Ceylon cacao is the mixed nature of the purple and white seeds.

The rubber industry attracted much attention during the year. The Para rubber tree has generally been planted, mainly in conjunction with tea and cacao.

Many other crops have been grown, and experiments with new varieties have been carried on by the agricultural department.

Composition of Wheat Flour.

In the *Book of the Rothamsted Experiments*, Mr. A. D. Hall discusses the question of the composition of the wheat grain and its mill products. This was a question to which Lawes and Gilbert devoted much attention. In a paper published in 1857, they showed that, as a result of experimental millings of wheat grain, the percentage of nitrogen was lowest in the flour itself, but increased considerably in the more branny portions. The ash was ten times as great in the coarsest bran as in the finest flour.

These investigators strongly protested, however, against the idea that the whole meal of the wheat grain is the most nutritive food, and that ordinary white bread is deprived of much of its value by reason of the removal of the bran. It was well known that the branny portions had a decided aperient action, which caused them to pass through the body too rapidly, consequently before the system had extracted as much nutritious matter as they should yield.

'Of course, if the branny portions were reduced to a perfect state of fineness, and it were found that this prevented the aperient action . . . there might be some advantage. But to suppose that whole-wheat-meal, as ordinarily prepared, is, as has generally been assumed, weight for weight more nutritious than ordinary bread-flour is an utter fallacy, founded on theoretical textbook dicta, not only entirely unsupported by experience, but inconsistent with it.'

Mr. Hall states that the result of an elaborate experimental test of this subject by the U. S. Department of Agriculture, during the last few years, has been to confirm fully Lawes and Gilbert's opinion of the superior nutritive value of white bread.



TRADE IN CITRONS IN BRINE.

The *Consular Report* on the trade of the Morea (Greece) for 1905 has the following reference to the trade in citrons in brine. A note on this trade during 1904 was published in the *Agricultural News* (Vol. IV, p. 180):—

The demand which has sprung up of late years for citrons has caused land owners in suitable localities to devote attention to their cultivation, so that quite a large business is now the result. The citron is cut in half and shipped in casks containing strong brine. The Greek fruit is considered of fine quality, and is mostly sold to the United States. Last year from Patras alone £7,500 worth went to the latter destination, and, exceptionally, some 300 tons, of a value of about £10,000 were shipped to the United Kingdom, which had hitherto imported very little of this fruit from Greece. In normal seasons, when the various producing countries in this part of the world have average crops, the price of citron in brine varies from £17 to £20 per ton, but last year there was a general shortage, and prices, which opened at £24 per ton, were gradually driven up to £38.

THE LIME INDUSTRY OF THE WEST INDIES.

The *Pharmaceutical Journal*, for April 28, has the following note on the West Indian lime industry:—

The exports of limes, concentrated lime juice, and essential oil of limes from Dominica are of the annual value of £45,370. Lime juice and oils are exported from Montserrat of the value of £8,090; limes and lime juice from Jamaica of the annual value of about £6,000. Trinidad also exports some lime juice.

The total lime shipments from Dominica, converted into barrels of fruit, on the bases of a concentration 11 to 1, and of 8 gallons of juice per barrel of fruit, are as follows:—

Year.	Barrels.	Year.	Barrels.
1895 ...	78,182	1900 ...	164,806
1896 ...	88,624	1901 ...	147,705
1897 ...	90,837	1902 ...	220,740
1898 ...	125,816	1903 ...	107,883
1899 ...	127,556	1904 ...	153,523

SHIPMENTS OF ESSENTIAL OIL OF LIMES.

	1899.	1900.	1901.	1902.	1903.	1904.
	Gals.	Gals.	Gals.	Gals.	Gals.	Gals.
Distilled oil of limes	3,315	3,990	3,299	4,761	2,740	2,261
Otto of limes ...	272	456	608	948	310	543

There is a steady demand for West Indian limes in the United Kingdom. The late Colonial and Indian Exhibition, held at the Crystal Palace, proved of considerable service in bringing limes under the notice of the British public, and encouraging their more general use instead of lemons.

HONEY FOR THE ENGLISH MARKET.

The following notes, extracted from an article on honey, in the *Agricultural Gazette* of New South Wales, for March last, are of interest in indicating the requirements of the English market with regard to honey:—

That Australian honey in England is not relished as an article of diet is well known to the Australian producer. There is no denying the fact that a deeply rooted antipathy towards Australian honey exists in the old land, caused, no doubt, by the inferior grades of the article shipped home.

'A burnt dog dreads the fire.' So Londoners and others having once tasted the inferior article sent home, have come to the conclusion that all our honey is of the same mixed character. Nevertheless, there are grounds existing for a dislike to some of our honeys. The honey produced from some of our native flora can never be improved. Bees have no power over the article they gather and store, neither has the variety of bee anything to do with it. No matter be they the high-classed Italians or the old-fashioned black bees, the article they bring home is one and the same. The hollow tree, box-hive, or bar-frame in no way affects the flavour of the honey obtained from the nectar of the flower. The honey extracted from the combs of the bar-framed hive is undoubtedly far more marketable than in either of the other bee-homes on account of the absence of the foreign matter therein contained.

We are told the chief characteristics in honey suitable for the British market are flavour, colour, and clearness. The best honey should be sweet and clean in flavour. By 'clean in flavour' I suppose is meant a honey that leaves no twang in the mouth after being eaten. In appearance, a honey that is something of a water-white is the honey that takes first place.

For table purposes the honey imported into Great Britain from California is the most sought after. This honey is obtained from a *Salvia* locally known as mountain sage, and also from lucerne. The United States of America is noted for the light-coloured honeys. We have therefore very little chance to obtain a footing in the London market with our honeys for table use until our rural population are seized with the idea of growing artificial forage plants. Along the coast districts white clover is making itself known to bee keepers, and the same may be said of lucerne, but the latter is cut for hay just as it comes into flower.

THE METAYER SYSTEM IN TUSCANY.

A recently issued *Consular Report* on agriculture in Tuscany gives the following particulars of what is known as the metayer system of land tenure:—

The greater part of the agricultural population is composed of metayers. The economic condition of metayers is a privileged one among all tillers of the soil. An equal division of the products of the soil between the owner and the farmer, with other advantages which are in favour of the metayer, is largely the rule in Tuscany.

Amongst the many advantages enjoyed by the metayer are the following: He pays no rent and no interest on advances made by the landlord for the purchase of cattle, implements, food, etc.; he is allowed land to cultivate as kitchen garden, to keep poultry and a pig for which he pays nothing beyond a small annual tribute in kind ('patto colonico'), such as vegetables, a few chickens or dozens of eggs and a ham.

THE PREVENTION OF YELLOW FEVER.

The following information in relation to the prevention of yellow fever has recently been issued by the Colonial Office:—

Yellow fever can be absolutely suppressed by the application of simple, practicable, and non-costly methods.

In order to carry them out the following facts must be known:—

1. It has been proved that yellow fever can only be transmitted by the bite of a particular mosquito known as the 'Tiger' or 'Brindled Mosquito' (*Stegomyia fasciata*), which must have previously bitten a person suffering from yellow fever; in no other way can it become infected. Yellow fever is not caused by opening up the ground, dredging, canal making, nor by contact with yellow fever patients, their clothes or bedding.

2. This mosquito is found in abundance in Mexico, the southernmost portions of the United States, Central and South America, the West Indies, as well as in many other places in tropical and sub-tropical countries.

It is common in the sea-ports but extends into inland towns following the trade routes.

3. It is essentially a town dweller and is the common 'Domestic' or 'House Mosquito.' It is not known to be a marsh or swamp dweller.

4. It breeds in the clean water receptacles in the yards of houses, and in consequence it is often known as the 'Cistern Mosquito.' The actively moving 'wrigglers' or 'wiggle waggles' which are found in great abundance in cisterns, barrels, and kerosene tins, used for the storage of water, constitute the larval stage of the mosquito.

5. It also breeds in old bottles, meat and condensed milk tins, flower pots, conch shells, and discarded receptacles of all kinds capable of holding water for a few days, and which are commonly found in all badly kept yards and rubbish heaps. It also breeds in rain water which may collect in canoes, in the lily tubs, and it may even make its appearance in the water vessels in the rooms, if the water is allowed to remain undisturbed in them for a few days.

6. It is not usually found in gutters, pools, or wells, but if debarred access to the common water receptacles it may be driven to seek unusual breeding places.

7. It must be remembered that if this mosquito is found in a house its breeding place is usually close at hand.

8. Because of the fact that the *Stegomyia* is a cistern breeder, yellow fever may occur in the wealthier and more sanitary parts of the town as well as in the poorer insanitary districts.

9. It is readily distinguished from other mosquitoes by its very characteristic appearance. It is a 'Black and White Mosquito.' There is a lyre-shaped pattern in white on the back of the thorax, transverse white bands on the abdomen, white spots on the sides of the thorax, and the legs have white bands, with the last hind tarsal joint also white.

10. The mosquito deposits its eggs on the water in the cistern. The eggs develop in from ten to twenty hours into the active wriggling larvae. The larval or wiggle stage lasts six and a half to eight days, and is then followed by the pupa stage; from the pupa in two days' time or even less a complete mosquito emerges and flies into the nearest house.

The eggs are resistant and capable of preserving their vitality although removed from water for some ten to ninety days. They may therefore persist for a long period in an empty damp barrel and develop into wrigglers when the barrel is filled. The larvae, however, quickly die if removed

from water. The mosquitos may live for many weeks in the rooms, verandahs, and outhouses.

11. Water is therefore essential to the existence of the mosquito, and to prevent the breeding of the *Stegomyia*, it is necessary—

- (1) That all water receptacles be rigidly screened.
- (2) That the material for screening be brass-wire gauze, 18 meshes to the inch to prevent ingress or egress of the mosquito, no chinks being overlooked, or an overflow pipe left unprotected.
- (3) That the brass gauze be fixed by wooden fillets or copper nails to wood, no iron nails to be used.
- (4) That each householder should set an example by screening his own water cistern.
- (5) That all public water cisterns should be screened, the local authorities, state, municipal, or ecclesiastic and others who control public cisterns, setting the example.
- (6) That in the yards of the poorer people each storage barrel be supplied with a spigot to draw off the water, and that the top be securely screened; loose covers being of no use. That as soon as possible all barrels be done away with and replaced by properly screened cisterns.
- (7) That odd receptacles such as tins, bottles, etc., be never allowed to litter the yards, but be gathered up and removed by the dust cart or buried in the ground.
- (8) That water should not be stored in kerosene tins.
- (9) That in an emergency, screening be done with cheese cloth until the permanent brass-wire screens are available, and at the same time 1 pint of kerosene oil be poured on the water in the cisterns and barrels at least once every week, pending the screening. Oiling must not take the place of permanent screening. It must be remembered that the oil is soon washed away by heavy rains.

NOTE.—Oil is used because it forms a film on the surface of the water and so prevents the wiggle waggles from coming to the surface to breathe; in consequence they soon die. The oil does not impart a taste to the water.

- (10) That merely emptying the water out of a barrel or other receptacle which contains wrigglers will not necessarily get rid of them, as they cling to the crevices and reappear when fresh water is poured in. In the same way heavy rains do not wash them out, as erroneously supposed. Careful screening is the only effective remedy.
- (11) That as the *Stegomyia* may seek refuge for breeding purposes in the shallow street drains and wells in the town, these must on no account be overlooked. The shallow street drains and pools should either be filled in or kept well treated with crude petroleum oils. Wells can with difficulty be properly protected and should be filled in or constantly oiled. Lily tubs and ornamental ponds should be stocked with fish.

(To be concluded.)



GLEANINGS.

It is proposed to continue for another season the assistance offered by the Government of the Leeward Islands to cotton growers by means of the Cotton Industry Loan Bill.

At a meeting of the Jamaica Board of Agriculture held on March 12 last, it was intimated that Mr. T. F. Teversham had, on account of ill-health, resigned his position as Lecturer in Agricultural Science.

To the list of gentlemen elected to form a Permanent Exhibition Committee at Dominica, published in the last issue of the *Agricultural News* (p. 168), the name of Mr. F. E. Everington should be added.

Because the banana is so easily digested, doctors have recommended the use of this fruit for patients recovering from enteric fever. Dyspeptic sufferers also benefit exceedingly from its systematic use, since the enfeebled stomach-coats have no difficulty at all in assimilating the substance of this splendid natural remedy.

In his opening addresses at the annual session of the Legislative Board in Surinam on May 8, his Excellency the Governor expressed the opinion that the establishment of a central sugar factory would be very beneficial to the industry. The production of rice in the colony, he said, showed an increase of 30 per cent.

The *Journal d'Agriculture Tropicale* (January 31, 1906) states that there is an improvement in the prices of all fibres, partly in consequence of a probable reduction in the output of Russian hemp on account of the political state of that country. The latest quotations for sisal were £39 13s. 4d. per ton. Manila, New Zealand, and Mauritius hemp have also advanced in price.

In an article on Mole Crickets in the *Agricultural News* (Vol. V, p. 122) it was mentioned that the cheapest and most effective method of controlling these pests in Porto Rico was with poisoned baits made of a grass known as 'Yerba dulce.' Specimens of this grass have been received from Mr. D. W. May, Special Agent-in-charge, and it appears to be *Eleusine indica*, which is reported from most of the West India Islands.

Mr. Christopher Head, whose visit to the West Indies, in connexion with Mr. Hesketh Bell's scheme for insurance against hurricanes, was mentioned in the *Agricultural News* (Vol. V, p. 129), was interviewed by a representative of the *Jamaica Gleaner* on May 2. Mr. Head expressed his appreciation of the kindness and assistance he had received from 'Government officers, and particularly from the various branches of the Imperial Department of Agriculture, and from the Agricultural Societies at the places he had visited.'

His Excellency the Governor assented on June 1 to an 'Ordinance to prevent the introduction into this colony [Grenada] of diseases of plants.' The Governor may, by proclamation, absolutely prohibit the importation of any plants, etc., from places named in the proclamation. Provision is also made for the fumigation and disinfection of plants imported into the colony.

The article by Professor J. P. d'Albuquerque, published in the last issue of the *Agricultural News*, on the use of cotton seed and cotton-cake-meal as a feeding stuff on West Indian plantations, will be issued shortly as Pamphlet No. 43. Cotton growers and stock owners will thus have, in a convenient form, full information as to the most economical way of utilizing this valuable by-product.

The *Queensland Agricultural Journal* says: 'Under the provisions of the Food and Drugs Act, arrowroot made from *tous-les-mois* (*Canna edulis*) may be sold in Great Britain only when labelled "Queensland arrowroot." A sample of a bulk lot was recently examined by the Agricultural Chemist, who pronounced it to be a starch of excellent quality and high purity. "This arrowroot differs from Bermuda arrowroot chiefly in containing much less insoluble fibre in its composition."'

In a letter, dated May 1, 1906, addressed to the Agricultural Superintendent, Grenada, Captain M. Short, of Richmond, Tobago, writes: 'I can supply at least 300,000, *Castilloa* rubber seeds. The seed will be available from the latter part of this month to about the middle of July. The price of the seed is 10s. per 1,000, or \$2 per 1,000 for any quantity over 20,000. I may mention that I supplied, two years ago, 200,000 for export outside the West Indies.'

The following is an extract from the 'Medical Journal' of the St. Lucia Agricultural School, signed by the Medical Officer: 'The sanitary condition of this school is excellent. The dormitory is large and well-ventilated—one of the best I have seen. The latrines are well looked after and the rooms and subsidiary buildings are kept scrupulously clean, and reflect great credit on the staff. The drainage is good. The effect of this is shown in the absence of any but the most trivial ailments amongst the pupils. The dietary is ample and of good quality.'

At a meeting of the Zoological Society held in London on April 10, Mr. C. Tate Regan read a paper on the fresh-water fishes of the island of Trinidad. According to *Nature*, 'the author's remarks were chiefly based on a collection made by Mr. Lechmere Guppy, Jr., and presented by him to the British Museum. The collection was accompanied by natural history notes and by a series of beautifully executed water-colour drawings. Forty species of fresh-water fishes were now known from the island; these were enumerated in the paper, and four of them described as new to science.'

Messrs. Henry W. Frost & Co., of Charleston and Savannah, report as follows on the Sea Island cotton crop for the week ending May 12: 'The weather has been unseasonably cool during the week, but throughout the Sea Island cotton belt not sufficiently so to have done any injury. There have been good rains in all three States, which, in some sections, were needed, so that the crop has now made a good start.' A week later the same firm reported: 'The weather has been favourable throughout the week, and the advices from all sections are that the crop is making fair progress.'

WIDTH OF CART TIRES.

A note in the *Queensland Agricultural Journal* on this subject contains the following:—

All European countries, advanced in road-making, have laws regulating the width of tires used on wagons, carts, and vehicles for heavy draught. In France the width of tires ranges from 3 to 10 inches, usually from 4 to 6 inches. Every market wagon and tonnage wagon is practically a road roller; the forward axle is about 14 inches shorter than the rear axle, so that the hind wheels run in a line about an inch outside the level rolled by the fore wheels. In Germany all carts for heavy loads must have a width of tire of at least 4 inches. In Austria the law demands from $4\frac{1}{2}$ to $4\frac{1}{2}$ inches.

Broad tires thus perform the duty of rollers in keeping a smooth and compact roadway free from ruts. Narrow tires tear up; wide ones consolidate. A wagon with 5-inch tires requires one horse less with a heavy load than one with 3-inch tires.

The Missouri Experiment Station has made a series of tests extending from January to September of last year in order to ascertain the value of wide tires as compared with narrow ones.

The Director of the station states that the conditions under which the narrow tires offer an advantage over the wider ones are 'unusual and of short duration,' and, further, that 'through a majority of days in the year, and at times when the dirt roads are most used, and when their use is most imperative, the broad-tired wagon will pull materially lighter than the narrow-tired wagon'; also that 'a large number of tests on meadows, pastures, stubble land, corn ground, and ploughed ground in every condition, from dry, hard and firm, to very wet and soft, shows without a single exception a large difference in draught in favour of the broad tires. The difference ranged from 17 to 120 per cent.'

As a result of all experiments conducted, he says: 'It appears that 6 inches is the best width of tire for combination farm and road wagon, and that both axles should be the same length, so that the front and hind wheels will run in the same track.'

BOTANICAL LABORATORY, JAMAICA.

Mention was made in the *Agricultural News* (Vol. III, p. 38) of the fact that the buildings at the Cinchona Gardens in Jamaica had been taken over by the New York Botanical Garden to be maintained as a botanical research laboratory. The *Journal of the New York Botanical Garden* for April 1906 has the following reference to the work that is being accomplished there:—

The Garden Laboratory at Cinchona, Jamaica, will be occupied during the spring by Professor Duncan S. Johnson, of Johns Hopkins University, and a party of his students, who go there to prosecute cell-studies on native plants of the Jamaica mountains, in continuation of the important investigations in cytology long prosecuted by him. As already reported in the journal, Dr. Forrest Shreve, also a student of Professor Johnson, is at present at Cinchona investigating the mistletoe and other parasitic plants of the forests, and pursuing studies on filmy ferns and on the relationships of tropical plants to soil and moisture. The demand for the use of this laboratory is increasing, and we are fortunate in being able to supply facilities for the use of the numerous students who desire to investigate one feature or another of the tropical flora.

WITCH BROOM DISEASE OF CACAO IN SURINAM.

The *Demerara Argosy*, of May 19, reports Governor Idenburg's opening address at the annual session of the Legislative Board in Surinam on May 8. His Excellency spoke as follows of the efforts that were being made to fight the witch broom disease of cacao:—

Encouraging also is the satisfactory condition of the cacao fields, where, on a somewhat large scale, the combating of the disease was attempted. The experiment was commenced in November 1904, on Maasstroem, and in April 1905 on Susannasdaal. A heavy lopping of the trees was followed by spraying with a preparation of copper. The trees thus treated produced a new, healthy, and strong top, and have set much fruit this year. On Maasstroem, unfortunately, a great many pods were lost through their getting black, a circumstance which, however, must not be ascribed to the infection. On Susannasdaal the trees are now full of sound fruit, in marked contrast to the surrounding fields, which abound with infected fruit. If those experiments continue successful, they may lead to important conclusions in solving a difficulty of great moment to the colony. The future may, therefore, be looked forward to, in this respect, not entirely without hope. Years of struggle, care, and disappointment have shown the undesirable results that have followed the action of colonial agriculturists in so largely devoting their attention to the cultivation of one product only.

Although the crisis in the cacao industry continued, the production in 1905 was considerably more than in 1904.

IMPERIAL DEPARTMENT OF AGRICULTURE AND AGRICULTURAL EDUCATION.

The following is a copy of a resolution passed by the Clergy of the Church of England in Antigua, and forwarded to the Imperial Commissioner of Agriculture by his Lordship the Bishop:—

The Clergy of the Church of England in the island of Antigua, assembled at a clerical meeting this seventh day of May, do hereby resolve:—

1. That the work in connexion with the agricultural education in secondary and in elementary schools, which has been developed and fostered by the Imperial Department of Agriculture in the island of Antigua, has been of great benefit to the schools and education generally.

2. That the work now being done is likely to lead to good results in the future.

3. That their grateful thanks are hereby tendered to the Imperial Department of Agriculture for their valuable help in the past, and it is hoped that every effort may be made to continue the work on the present lines.

DEPARTMENT NEWS.

The Imperial Commissioner of Agriculture left Barbados in R.M.S. 'Orinoco' on Wednesday, June 6, for the United Kingdom.

Mr. Thomas Thornton, A.R.C.S., Travelling Inspector in connexion with Cotton Investigations, left Barbados in R.M.S. 'Eden' on May 29 for St. Vincent. Mr. Thornton returned to Barbados on June 5.



POULTRY NOTES.

Selection of a Variety.

In a leaflet entitled 'Hints to Poultry Raisers,' recently issued by the U. S. Department of Agriculture, the following information in regard to the varieties of fowls is given in a useful and concise form for the benefit of poultry raisers:—

Pure-breds are desirable, as with these one has a flock of fowls which will produce carcasses and eggs of a much more uniform shape, colour, and size than mongrels will produce, all of which will aid in finding a ready sale. If one already has a flock of mongrel fowls and cannot afford to buy pure-breds, he should choose a pure-bred male bird of the breed preferred and mate him with a few of the best mongrel females. This system, if carefully followed for a few years, will give a high-grade flock that will be practically as good as pure-breds, so far as market conditions for dressed fowls and eggs are concerned.

Choice of a variety will depend largely on the purpose for which the fowls are kept—whether eggs alone, both eggs and meat, or meat alone is the chief object; whether white-shelled or brown-shelled eggs are desired; and whether sitters or non-sitters are wanted.

Egg breeds.—Non-sitters and producers of white-shelled eggs—Leghorns and Minorcas.

General-purpose breeds.—Sitters and producers of brown-shelled eggs—Plymouth Rocks, Wyandottes, Orpingtons, and Rhode Island Reds.

Meat breeds.—Sitters and producers of brown-shelled eggs—Brahmas, Cochins, and Langshans.

Indian Runner Ducks.

The following is extracted from the *Journal of the Jamaica Agricultural Society* for May:—

We again call attention to this breed of ducks as a most useful one for conditions in Jamaica. With the exception of Muscovies, which are very hardy, none of the large breeds of ducks has been really successful here, such as the Aylesbury, Pekin, and Rouen, which are all excellent table breeds, while the Muscovy is not what could be called good eating—when used young, however, it is excellent. The Indian runners are a small breed carrying themselves very erect, and, as the name will indicate, they are very active; they are very gamey in flavour, though they are not large. Their chief characteristic is, however, their excellent laying ability. They lay large, white eggs, and lay more than, or at least as many as, the best laying Leghorn hens. In a recent twelve-months duck-laying contest held in Australia, they put even the much-desired 200-egg hens quite in the shade. In this contest five pens of six ducks laid during the year 1,315, 1,232, 1,132, 1,061, and 1,013 eggs, respectively. While it is difficult to get hens to lay even in our winter months from October to December, and eggs are dear then, this is just the time of the year when these ducks lay most. They are hardy and easily kept, and the ducklings are active and comparatively easy to raise.

PREVENTION OF BUSH FIRES.

The *Port-of-Spain Gazette* of May 8, contains the following précis of the Trinidad Ordinance dealing with the matter of the prevention of bush fires:—

Any one desirous of setting fire to the land must give full notice to the Warden of the district. Such notice must supply the exact situation, and the extent of the boundaries; and the person desirous of setting fire must also cause a lane, at least 25 feet in width, to be cleared round the part intended to be affected: that is to say, all inflammable matter must be taken away from this path, thus leaving it quite clear. The Warden, on receipt of such a notice, must either inspect in person, or appoint some capable person to inspect, the spot where the fire is to be. A circuit must be made round the part cleared, and everything must be certified to be in proper order, before the license is issued. If the Warden himself has not inspected the place, the man appointed to inspect must furnish the Warden with a certificate stating that he has inspected the place, and give full details of such inspection. The Warden after satisfying himself that all is correct, then issues the license to set fire. On this license it must be specially set forth the exact number of days that the license is to be in force. The person obtaining this license has within twenty-four hours of its issue to give notice at the nearest station of constabulary, and must also acquaint the owners of the lands adjoining of the fact, let them know the specified days of the week and month. The person who has a license granted to him must also cause the lane surrounding the spot to be closely watched by some responsible person during the continuance of the fire. The duties of the police are merely to see that all has been done in accordance with the regulations, but they are not responsible. Should the fire break bounds, or fresh outbreaks occur in places not specified in the license, the police have to notify the Warden at once, and he is supposed, or rather required, by the Ordinance to repair to the spot or spots at once. The Warden is allowed to call upon any able-bodied person, over the age of sixteen, to assist him in his duties, and he has the power to remunerate any such person for the work done. Such persons called upon are bound to assist. Of course, any member of the constabulary or the Justice of the Peace of the district has this same power of calling for outside help.

RAINFALL AT ST. VINCENT.

The Agricultural Superintendent at St. Vincent has communicated to the *Sentry*, of May 11, the following interesting statement with regard to the rainfall:—

Now that the dry season appears to have come to an end, it may be of interest to your readers to learn how the rainfall recorded at the Botanic Station compares with that of previous years.

The total rainfall for the past four months was 13.75 inches, which is 3.91 inches below the average of the same months of the five previous years. The very low rainfall of last month was chiefly responsible for this, as only 1.53 inches were recorded as against an average of 3.66. The rainfall of the first three months was also below the average, with the exception of the month of March, which was 6 points above; but in this case the rainfall was not well distributed, 2.55 inches of the 4.09 being recorded from the 11th. to the 22nd.

It will be seen, then, that the exceptionally dry month of April, is responsible for the somewhat late spring this year, and the backward state of cultivations generally.

WEST INDIAN PRODUCTS.

Drugs and Spices in the London Market.

The following report on the London drug and spice markets for the month of April has been received from Mr. J. R. Jackson, A.L.S.:—

The advent of the budget, which has been somewhat delayed this year, has had the effect of diminishing trade generally. The fortnightly sales have been practically non-existent in consequence of the intervention of the holidays. They were resumed only on the 26th., after a lapse of four weeks. The following are some of the quotations for the principal drugs and spices during the month:—

GINGER.

At the spice sales on the 4th. a quiet but firm tone prevailed in Jamaica ginger, of which some 220 packages of old crop were offered and bought in at the following rates: for good common, 67s. to 68s.; dull to good washed, 70s. to 80s. Unsorted native-cut Cochin fetched 45s.; and ordinary wormy Calicut 29s. 6d.; some washed rough slightly wormy was bought in at 33s. to 34s.; and limed Japan at 27s. At the auction on the 11th. there was a small sale of fair to good washed Jamaica at 62s. to 69s.; and common at 60s. A fair business was also done privately in small and medium native-cut at 45s. At the same auction, small native-cut Cochin was bought in at 45s. and limed Japan at 25s. On the 25th. a drop took place in the prices realized for old-crop Jamaica, some 360 barrels being offered and 290 sold without reserve at 55s. 6d. to 58s. 6d. for fair common, and 52s. to 55s. for common. New crop was in steady demand at 62s. to 68s. for fair washed, and 57s. for small washed.

ARROWROOT.

This article was offered at the spice sale on the 4th. to the extent of some 559 barrels of good manufacturing St. Vincent, all of which was bought in at 2½d. per lb. Good Natal was also offered at the same sale and bought in at from 4d. to 4½d.

SARSAPARILLA.

The demand for this article continues, and the prices from week to week show but slight fluctuation. At the drug auction on the 5th., 2s. 6d. was the price asked for grey Jamaica, and 1s. 9d. for Lima-Jamaica; but it was reported that there was practically none in the market. The lowest quotation for native Jamaica was 1s. 1d. It was stated that the arrivals during the week were 21 bales of red native Jamaica and 3 bales of grey Jamaica. A week later, the quotations were 2s. 6d. for grey Jamaica, and 1s. 2d. for Guatemala. In the auction room on the 19th. it was reported that about 23 bales of grey Jamaica had arrived during the week and at the sale on the 26th. there was a steady demand at from 2s. 1d. to 2s. 2d., according to quality. Twenty-three bales of native red, for which there was much demand, were disposed of at from 10½d. to 1s. 0½d. It was stated that 35 bales of Lima-Jamaica would probably be offered at the next sale.

TAMARINDS.

Of other West Indian products, Barbados tamarinds, new crop, were offered at the beginning of April, but were bought in at 30s. At the last auction some 77 packages of West Indian were offered and only 49 sold at lower rates, viz., good Antigua, new crop, 14s. to 14s. 6d. per cwt. in bond for 12 barrels of low stony Antigua and Barbados, upon which there was no reserve; no offer was made.

KOLA NUTS, CASSIA FISTULA, LIME JUICE, ETC.

Of kola, 10 barrels of fair West Indian were disposed of at the auction on the 26th. at 3½d., and 3 packages of West Indian dried native from 2¾d. to 4½d.; the latter price being given for fair Grenada halves. At the same sale 7 bags of new Cassia Fistula pods from Dominica were all sold at 18s. Good raw Jamaica lime juice was quoted at 1s. 3d. per gallon.

LIME NITROGEN OR CALCIUM CYANAMIDE.

In the last volume of the *Agricultural News* (p. 70) an account was given of the manufacture and properties of a new nitrogenous fertilizer known as calcium cyanamide. Special interest attaches to this fertilizer in that it 'represents the first attempt, on a commercial scale, to bring atmospheric nitrogen into a state of combination, to manufacture, in fact, an artificial manure containing nitrogen obtained from the air.' In the *Journal of the Board of Agriculture* (London), for April 1906, a summary is given of recent experiments carried out in Germany for the purpose of testing its effect. The following information is extracted from this article:—

Experiments as to its effect on germination, carried out by Dr. Haselhoff at Marbourg, showed, generally, that the direct action of lime nitrogen was injurious, but that the injury was dependent on the length of time the nitrogen was given to the soil before the seed was sown. Thus, if soil which had received ½ per cent. of lime nitrogen was employed, and sowing took place a week after the manuring, the final result of the germinating test was unaffected, in the case of both clover and mustard. If sand alone was used, the germinating power of clover was somewhat diminished, even when the manure was applied a fortnight before; and if the seed was sown in less than a fortnight, germination did not take place.

Looking at the results obtained in the pot experiments, undertaken to test its manurial value, it is considered that, if the effect of the nitrogen in nitrate of soda be expressed as 100, the action of lime nitrogen is equal to 79. It is also evident that lime nitrogen acted favourably on plant growth when a sufficiently long period elapsed between its application and the sowing of the seed.

In general, all the trials with barley, potatoes, and mangels were favourable to the action of lime nitrogen. From the whole of the experiments Dr. Haselhoff concludes that lime nitrogen affects the germination of the seed, but so soon as the injurious properties are dissolved by the soil, the nitrogen it contains is available as plant food, and its action approximates to that of nitrate of soda. The period required to dissipate the injurious combinations in lime nitrogen varies according to the character of the soil, and for the present, caution is recommended in regard to its employment in actual practice.

Another series of pot experiments to test the action of this substance on germination is reported by Professor Schulze, of Breslau. In 1905 the experiments were repeated on a more comprehensive scale. Generally, Dr. Schulze recommends, in order to avoid all danger, that this manure should be applied from a week to a fortnight before the seed is sown, and this is the conclusion that may be drawn from the experiments generally. The effect of the new fertilizer appears to be about 93 to 94 per cent. of that of nitrate of soda.

MARKET REPORTS.

London,—May 16, 1906. Messrs. KEARTON, PIPER & Co.; Messrs. E. A. DE PASS & Co.; 'THE WEST INDIA COMMITTEE CIRCULAR'; 'THE LIVERPOOL COTTON ASSOCIATION WEEKLY CIRCULAR,' May 11; and 'THE PUBLIC LEDGER,' April 28, 1906.

ALOES—Barbados, 15/- to 60/-; Curaçoa, 20/- to 65/- per cwt.

ARROWROOT—St. Vincent, 2d. per lb.

BALATA—Sheet, 1/4 to 1/11; block, 1/4 to 1/4½ per lb.

BEES'-WAX—£8 to £8 10s. per cwt.

CACAO—Trinidad, 55/- to 62/- per cwt.; Grenada, 50/- to 54/- per cwt.

CARDAMOMS—Mysore, 7½d. to 3/- per lb.

COFFEE—Jamaica, good ordinary, 39/- to 41/- per cwt.

COTTON—West Indian, medium fine, 6.65d.; West Indian Sea Island, medium fine, 13½d.; fine, 14½d.; extra fine, 16d. per lb. Prices paid, 9½d. to 20d. per lb.

FRUIT—

BANANAS—Jamaica, 4/- to 6/- per bunch.

GRAPE FRUIT—16/- to 18/- per box.

LIMES—4/- to 4/6 per box.

ORANGES—Jamaica, 5/6 to 8/- per case.

PINE-APPLES—St. Michael, 1/9 to 4/- each.

FUSTIC—£4 to £4 10s. per ton.

GINGER—Jamaica, 57/- to 63/- per cwt.

HONEY—Good to fine pale amber, 25/- to 33/-; dark to good pale, 17/- to 24/- per cwt.

ISINGLASS—West Indian lump, 1/6 to 2/2; cake, 1/1 to 1/3 per lb.

KOLA NUTS—4d. to 6d. per lb.

LIME JUICE—Raw, 11d. to 1/3 per gallon; concentrated, £20 5s. per cask of 108 gallons; hand-pressed, 2/3 to 2/4 per lb. Distilled Oil, 1/9 to 1/10 per lb.

LOGWOOD—£4 to £4 15s.; roots, £3 10s. to £4 per ton.

MACE—Fair to good pale, 1/5 to 1/6; red, 1/3 to 1/4 per lb.

NITRATE OF SODA—Agricultural, £11 12s. 6d. per ton.

NUTMEGS—64's, 1/5; 70's, 11d.; 82's, 10d.; 90's, 8½d.; 114's, 7d.; 125's, 6d. per lb.

PIMENTO—Fair, 2½d. to 2½d. per lb.

RUM—Jamaica, 2/1; Demerara, 9d. to 11d. per proof gallon.

SUGAR—Yellow crystals, 14/6 per cwt.; Muscovado, 13/- to 15/- per cwt.; Molasses, 10/6 to 14/6 per cwt.

SULPHATE OF AMMONIA—£12 3s. 9d. to £12 15s. per ton.

Montreal,—March 19, 1906.—Mr. J. RUSSELL MURRAY.
(In bond quotations, c. & f.)

COCOA-NUTS—Jamaica, \$26.50 to \$28.50; Trinidad, \$25.00 to \$26.00 per M.

COFFEE—Jamaica, medium, 10c. to 11c. per lb.

GINGER—Jamaica, unbleached, 10c. per lb.

MOLASCUIT—Demerara, \$1.00 per 100 lb.

MOLASSES—Barbados, 27c. to 28c.; Antigua, 23c. per Imperial gallon.

NUTMEGS—Grenada, 110's, 18c. per lb.

PIMENTO—Jamaica, 5½c. per lb.

SUGAR—Grey crystals, 96°, \$2.10 to \$2.20 per 100 lb.

—Muscovados, 89°, \$1.60 to \$1.75 per 100 lb.

—Molasses, 89°, \$1.40 to \$1.50 per 100 lb.

—Barbados, 89°, \$1.55 to \$1.80 per 100 lb.

New York,—May 18, 1906.—Messrs. GILLESPIE BROS. & Co.

CACAO—Caracas, 11½c. to 13c.; Grenada, 10¼c. to 11c.; Trinidad, 11¼c. to 11½c.; Jamaica, 9½c. to 10½c. per lb.

COCOA-NUTS—Jamaica, \$21.00 to \$22.00; Trinidad, \$18.00 to \$19.00 per M.

COFFEE—Jamaica ordinary, 8¼c. to 8½c.; good ordinary, 8½c. per lb.

GINGER—Dark scraggy root, 10c. to 11½c.; white to bright bold, 11½c. to 13½c. per lb.

GOAT SKINS—Barbados, Dominica, and Antigua, 57c. to 58c.; Jamaica, 60c.; St. Kitt's, 50c. per lb.

GRAPE FRUIT—Jamaica, \$5.00 to \$8.00 per barrel; \$3.00 to \$5.00 per box.

MACE—29c. to 34c. per lb.

NUTMEGS—West Indian, 80's, 23c.; 90's, 20½c.; 100's, 19c.; 110's, 15½c. per lb.

ORANGES—Jamaica, \$3.75 to \$4.25 per barrel; \$1.75 to \$2.25 per box.

PIMENTO—5c. per lb.

SUGAR—Centrifugals, 96°, 3.42c. to 3.48c.; Muscovados, 89°, 2.92c. Molasses, 89°, 2.67c. per lb.

INTER-COLONIAL MARKETS.

Antigua,—May 31, 1906.—Messrs. GEO. W. BENNETT BRYSON & Co., LTD.

SUGAR—\$1.40 per 100 lb.

MOLASSES—18c. per gallon.

Barbados,—May 28, 1906.—Messrs. T. S. GARRAWAY & Co., and Messrs. JAMES A. LYNCH & Co.

ARROWROOT—St. Vincent, \$4.00 to \$4.25 per 100 lb.

CACAO—\$11.25 to \$11.50 per 100 lb.

COCOA-NUTS—\$10.00 per M. for husked nuts.

COFFEE—\$10.50 to \$11.75 per 100 lb.

HAY—\$1.15 \$1.20 per 100 lb.

MANURES—Nitrate of soda, \$65.00; Ohlendorff's dissolved guano, \$55.00; Cotton manure, \$48.00; Cacao manure, \$45.00; Sulphate of ammonia, \$75.00; Sulphate of potash, \$67.00 per ton.

MOLASSES—Muscovado, 17c. to 18c. per gallon.

ONIONS—Lisbon, \$3.00 to \$4.00 per 100 lb.

POTATOS, ENGLISH—Nova Scotia, \$2.50 per 160 lb.

RICE—Ballam, \$5.60 to \$5.75 per bag (190 lb.); Patna, \$3.30; Rangoon, \$2.65 to \$2.75 per 100 lb.

SUGAR—Muscovados, 89°, \$1.35; Dark crystals, 96°, \$1.80 per 100 lb.

British Guiana,—June 2, 1906.—Messrs. WIETING & RICHTER.

ARROWROOT—St. Vincent, \$8.00 per barrel.

BALATA—Venezuela block, 25c.; Demerara sheet, 38c. per lb.

CACAO—Native, 12c. to 13c. per lb.

CASSAVA STARCH—\$4.00 per barrel.

COCOA-NUTS—\$10.00 to \$12.00 per M.

COFFEE—13c. to 14c. per lb.

DHAL—\$5.40 to \$5.50 per bag of 168 lb.

EDDOES—\$1.44 per barrel.

MOLASSES—15½c. per gallon.

ONIONS—Lisbon, 6c. to 7c. per lb. (ex store).

PLANTAINS—20c. to 40c. per bunch.

POTATOS, ENGLISH—\$2.40 to \$3.00 per barrel.

POTATOS, SWEET—Barbados, \$2.04 per bag.

RICE—Ballam, \$5.35 per 177 lb.; Creole, \$4.40 to \$4.50 per bag (ex store).

SPLIT PEAS—\$5.85 to \$5.90 per bag (210 lb.).

TANNIAS—\$1.20 per barrel.

YAMS—White, \$2.28; Buck, \$3.50 per bag.

SUGAR—Dark crystals, \$1.85 to \$1.90; Yellow, \$2.20 to \$2.25; White, \$3.40 to \$3.50; Molasses, \$1.40 to \$1.80 per 100 lb. (retail).

TIMBER—Greenheart, 32c. to 55c. per cubic foot.

WALLABA SHINGLES—\$3.00, \$3.75, and \$5.25 per M.

Trinidad,—May 18, 1906.—Messrs. GORDON, GRANT & Co.; and Messrs. EDGAR TRIPP & Co., May 19, 1906.

CACAO—Ordinary to good red, \$11.50 to \$11.75; estates, \$12.00 to \$12.25 per fanega (110 lb.); Venezuelan, \$12.75 to \$13.00 per fanega.

COCOA-NUTS—\$20.00 per M., f.o.b.

COCOA-NUT OIL—65c. per Imperial gallon (casks included).

COPRA—\$3.25 to \$3.40 per 100 lb.

DHAL—\$4.50 to \$4.70 per 2-bushel bag.

MOLASSES—18c. per gallon.

ONIONS—\$3.00 per 100 lb. (retail).

POTATOS, ENGLISH—\$1.30 to \$1.50 per 100 lb.

RICE—Yellow, \$4.60 to \$5.00; White, \$4.80 to \$6.00 per bag.

SPLIT PEAS—\$5.00 to \$5.75 per bag.

SUGAR—Yellow crystals, \$2.00 to \$2.25; Molasses, \$1.90 to \$2.00 per 100 lb.



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The Report of the Board of Agriculture for 1904-5 states: 'The fact that some of the new varieties of canes give heavy yields on parts of the back lands of sugar estates, where the Bourbon was not able to produce remunerative returns, has set free from cane cultivation lands in the front of estates, and this is being carefully taken up by East Indians for rice growing. The negroes of the colony are slowly following the example of the East Indians and are cultivating rice on some of their village lands.' The total area under rice in the year 1904-5 was placed at 21,920 acres, the crop being 22,597 tons of paddy, equal to 15,600 tons of clean rice.

Although more recent returns have not yet been received, it would appear that the extension of the area devoted to this crop is being maintained. It is mentioned in a recent issue of the *Demerara Argosy* that in one district alone, viz., Leguan, 400 acres have been taken up by rice farmers during the present season. The growers in Berbice, particularly, having settled on abandoned sugar estates, which are excellently adapted to rice growing, have largely extended their cultivation. Rapid strides have also been made on the East Coast.

Rice Growing in British Guiana.

REFERENCES have previously been made in the *Agricultural News* to the very appreciable extension that rice cultivation has undergone in British Guiana during the past few years.

A table published in the last *Annual Report* on the colony shows that the extension of the area under rice cultivation during recent years has very considerably affected the amount of rice imported into the colony. The table shows a drop from 431,679 cwt. in 1895-6 to 183,145 cwt. in the year under review (1904-5), when the imports of this commodity were valued at £94,892.

In the article in the *Argosy* referred to above, it is stated that, for the first time in the history of the industry, rice had been exported from the colony. Two shipments, amounting to 2,500 bags, had recently been made to Barbados, where good prices had been realized.

In addressing a large meeting of farmers and villagers on the East Coast on May 28, Mr. H. Gaskin, of the Clonbrook Rice Factory, spoke of the possibilities of the rice industry and of the benefits that might be derived from its pursuit. 'Rice was a product,' he said, 'which would not perish quickly, would not too soon glut the market, and could be exported. The same could not be said of ground provisions. Besides, at the present moment there was a scarcity of rice in India.' The meeting pledged its hearty support to the industry.

The question of the extension of the rice cultivation, particularly among the peasantry, has received considerable attention from the Subsidiary Products Committee of the British Guiana Board of Agriculture, which has all along been convinced of the suitability of the low-lying coast lands of the colony to this crop. Experimental tests of selected varieties of rice imported from Ceylon have been carried out by the Board during the last few years. These tests indicate that the imported varieties mature in a shorter time than the 'Creole' rice, and also give a larger return. The yields of paddy from most of the imported varieties were from 20 to 30 cwt., as against 14.6 cwt. per acre from the local kind. With the latter, five to six months elapse from the time the farmer prepares his land to the reaping season, but in these trials the imported varieties were found to mature in four months. Seed of these varieties has been distributed, free of cost, to those making application for it.

It is evident that the yields ordinarily obtained from rice in British Guiana vary very considerably. The average has been placed by competent authorities at about 28 bags of paddy to the acre; as a bag weighs 120 lb., this would be 30 cwt. per acre. In a paper on this subject read at the last West Indian Agricultural Conference, the Hon. B. Howell Jones mentioned that in certain places, in comparatively new land, he had seen as many as 38 bags produced by a single acre. So far, species of 'hill' rice, grown in India without water, had, he said, grown far better in the swampy lands of British Guiana than many other varieties.

It may be mentioned that rice is also cultivated, though not to a very large extent, in Trinidad and Jamaica. In St. Lucia between 50 and 100 acres are under cultivation.

It has sometimes been suggested that 'Upland' rice might be more extensively cultivated in the West India Islands. But this kind of rice gives a much smaller return than swamp rice. Rice is a plant that shows considerable power of adaptability, and many of its varieties will thrive under dry cultivation, but it is stated that the yield, under such conditions, is rarely more than one-third of the amount produced on the same area under irrigation.



SUGAR INDUSTRY.

Java.

The following extract from the *Consular Report* on the trade of Java for the year 1905 reviews the position of the sugar industry in that island. A similar review for the previous year appeared in the *Agricultural News*, Vol. IV, p. 227:—

Notwithstanding the fact that the planted area was slightly larger, the 1905 sugar crop only yielded a production of 1,028,357 tons, or a decrease of 36,398 tons, as compared with that of the previous year. This must be attributed to the unfavourable weather experienced during the planting season; at the time when copious rains were most required there occurred periods of drought, which had an injurious effect on the canes and resulted in the juices being of inferior quality. The satisfactory prices obtained by planters, recorded in my last report, were not only well maintained but later in the season rose to a level which has not been approached for some years.

With regard to cane diseases, Mr. Vice-Consul Rose reports as follows:—

'Progress is noticeable in the endeavours made to eradicate the many diseases to which sugar-cane is liable, the success being due, in great measure, to the process of careful selection. The best results were again obtained from the seedlings, the popularity of which increases annually. The foreign cane has fallen into disfavour and is likely soon to be entirely abandoned, while the indigenous cane, although yielding good results, proves expensive through having to be nurtured in gardens in the hills.'

As foreshadowed in my last report, the profits made by mills on the 1904 working were in most cases expended on new machinery, and the majority of the mills in Java may now be said to be up to date as far as installation is concerned. Many are now capable of producing, in addition to the usual qualities, superior sugar, which in shade and grain most nearly approaches the refined article and finds a ready market in India.

With the exception of the United Kingdom, which only took 9,230 tons, as against 55,511 tons in 1904, the exports to various countries have been much on the same scale as during the preceding year.

The results obtained from the free use of sulphate of ammonia and ground-nut cake on sugar plantations continue to be most beneficial.

Sugar-cane Experiments in British Guiana.

The following is extracted from a report by the Director of Science and Agriculture, British Guiana, on progress in the sugar-cane experiments carried on under his direction at the experiment fields attached to the Botanic Gardens during the period July 1, 1905, to March 31, 1906 :—

During the period under review the sugar-cane experiments have been carried on under my control, assisted by the advice of the members of the Sugar-cane Experiments Committee of the Board of Agriculture. The actual conduct of the work has devolved upon Mr. R. Ward, Agricultural Assistant to that Board.

On July 1, 1905, 400 selected new kinds of seedlings in addition to a large number of older varieties, were being cultivated on small plots.

Owing, probably, to the exceptional dryness of the weather a large proportion of the arrows were abortive and many remained arrested in their sheaths. The great scarcity of fertile seeds produced this year was probably due to the same cause. One hundred and forty-two sowings were made, and only 4,177 seeds of four varieties germinated, a very low rate. About 965 young seedlings have been secured.

The most prolific variety was No. 1,087 followed by No. 625 and by No. B. 147.

The cross-fertilization experiments failed completely, no seeds obtained from them germinating.

On North field the average yield of the third ratoon canes was at the rate of 25·4 tons of canes per acre, that of the second ratoons 22·1 tons; No. 625 giving the biggest yield with 34·7 tons, followed by No. 3,956 with 31·5 tons.

The average yield of the varieties planted in South field and reaped as second ratoons, twelve months old, was at the rate of 18·0 tons per acre. No. 115 gave 19·7 tons. The average yield of plant canes was 23 tons of canes per acre.

The manurial experiments have again produced singularly clear proofs of the dependence of the yield of the sugar-cane on the proportion of available nitrogen added in the manures and, with others previously reported, show that the various varieties of sugar-cane resemble the Bourbon in the dependence of their yield upon this constituent.

In the case of phosphatic manures, the results confirm the opinion expressed in January 1904 that, if a British Guiana sugar-cane soil shows on analysis a content of 0·008 per cent. of phosphoric acid soluble in 1 per cent. citric acid solution or of 0·002 per cent. soluble in two-hundredth normal hydrochloric acid, under conditions of constant shaking for five hours, manuring with phosphate in all probability will not produce commensurately increased yields of sugar-cane.

The above conclusion, based on the results of fourteen years' field experiments, is an important one for the guidance of planters in this colony. Until recently, large quantities of slag-phosphates were yearly imported at an approximate cost on the field of, say, \$20·00 per ton, and applied to the soil at the rate of several hundredweights per acre. By submitting a properly drawn sample of the soil, to which he contemplates applying slag-phosphates, for analysis (at a cost of \$2·50), the planter ascertains whether his soil contains more or less than 0·008 per cent. of phosphoric acid soluble in 1 per cent. citric acid, and thus is guided as to the advisability of applying phosphates. In my opinion, considerable economy has ensued from the adoption of this course.

The following table, arranged in order of their yields of indicated saccharose, shows the rates of yields of canes per acre and the saccharose contents of the expressed juices of the

varieties of canes which were reaped in December 1905, as fifth ratoons on the Brickdam field :—

Variety.	Tons canes per acre.	Saccharose. Pounds per gallon.	White Transparent.
2,468 ...	40·8	1·666	192·3
145 ...	28·6	1·827	162·0
625 ...	33·8	1·588	155·3
109 ...	27·6	1·863	151·9
147 B. ...	32·0	1·681	150·0
135 ...	24·7	1·822	124·5
1,087 ...	30·3	1·432	122·6
115 ...	24·4	1·645	117·3
White Tran'spt.	18·6	1·822	100·0
SECOND RATOONS.			
790 ...	31·3	1·286	150·9
FIRST RATOONS.			
1,184 ...	16·2	1·796	75·0

These canes were not 'supplied,' and hence the results are indications of the actual ratooning powers of the varieties as compared with the White Transparent.

The very low yield of B. 208, which is in striking contrast to the yields obtained from the variety when cultivated on very large scales on estates on the Demerara river, is due in my opinion to one of two causes—either the unsuitability of B. 208 for cultivation on very heavy clay soils, or that the cane sent to us from Barbados as B. 208 is a different variety to the one grown at plantations Diamond and Wales under that designation. In its general character, mode of growth, and relative yield per acre, B. 208 as grown by us resembles, but is inferior to, D. 102, a variety we have discarded.

Two hundred and ninety mule-cart loads of canes were distributed during the last fortnight of December to the various plantations which applied for them. I am of opinion that we now know sufficient about our new varieties of canes to be able to recommend some of them, such as D. 109, D. 145, D. 625, and B. 147, with confidence to cane farmers, and I hope to receive applications from them.

As the Imperial Grant-in-aid, which commenced to be available in 1899, ceased to be payable from March 31, 1906, this is the final progress report dealing with its expenditure. That grant has been expended solely in payment of the salary of the Agricultural Assistant, in allowances to two junior officers of the Government Laboratory, and in labourers' wages. It has enabled us largely to increase the operations of our sugar-cane experiments, and indirectly to extend the experiments to products other than sugar, while some measure of the success of the administration of the Imperial Grant-in-aid for the West Indies may be found in the extension of the area occupied by new seedling varieties in the colony from about 550 acres in 1899 to 20,065 in 1906, and in that during the last five years we have recorded that new varieties of seedling canes have given, over large areas, mean results of 8, 10, 22, and 35 per cent. higher than the average of the returns obtained from the Bourbon during the same period.



WEST INDIAN FRUIT.

CULTIVATION OF LEMONS.

The following note on the cultivation of lemons is extracted from a bulletin recently issued by the Hawaii Agricultural Experiment Station, entitled 'Citrus Fruits in Hawaii':—

In most particulars the lemon may receive essentially the same treatment as the orange. The methods of propagation, tillage, irrigation, etc., are the same. It is seldom grown on its own roots. In California the favourite stock for the lemon is the sweet orange seedling. The pruning of the lemon trees and the curing of the fruit are quite distinct from the practice in relation to oranges.

PRUNING.

The lemon has not the same tendency to compactness of form as is found in the orange tree. Its habit is straggling, and if left to itself it will produce its fruit on the ends of long branches. It therefore requires a method of pruning persistently pursued, if the best results are to be secured. There are several elaborate systems of pruning which are in use, but the aim of them all is to produce a compact, but not too dense, low-headed tree with a large amount of bearing surface on easily accessible branches. This is secured by cutting back the leader or main stem of the tree when it is set and forcing out stray branches, three or four of which are selected to form the framework of the tree. These, in turn, are persistently pinched or cut back and encouraged to assume a nearly horizontal position. Any branches that start to make a strong growth in a vertical direction are cut out. This continuous pinching and cutting back tends, however, to produce a very dense mass of branches and foliage, and some thinning out becomes necessary. The general result of such systems is a low, flat-topped tree, from which most of the fruit may be gathered without the use of long ladders.

PICKING.

Lemons are always picked green. If ripened on the trees, they lose in their characteristic acidity and become too large. They are taken from the trees when they will just fit a $2\frac{1}{4}$ -inch ring, and must be clipped like an orange and handled with the same care.

CURING.

The curing and storing of lemons is a much more prolonged and difficult process than that of oranges. Simple methods of curing may suffice when the lemons can soon be marketed, but when it is intended to hold them for many months for the best markets, special devices are required and

the skill of one who has had experience in the business. The objects aimed at are, in part, the same as in the case of the orange, but, further, the lemon must attain its proper colour, the thickness of the rind must be greatly reduced, the acidity increased, and the fruit preserved in marketable condition for a long time. This is attained by keeping the fruit in a dark place, in a temperature as nearly uniform as possible, and with sufficient ventilation to prevent moulding and decay, but not enough to cause the wilting of the fruit. Where the business is conducted on a large scale curing houses are provided.

PINE-APPLES IN PORTO RICO.

The *Bulletin of the Department of Agriculture, Jamaica*, for May, contains an article on 'Agriculture in Porto Rico,' reprinted from the *Register of Porto Rico*, for 1905. The following reference is made to the cultivation of pine-apples in orange groves:—

Pine-apple culture has been taken up largely by the orange growers as a means of deriving some income while waiting for their groves to come into bearing. When planted between the rows of trees, about 4,000 pine-apple plants can be set out to the acre without interfering with the trees, and when planted by themselves from 8,000 to 10,000 pines can be set out to the acre. The pines which appear to grow best in Porto Rico are the Red Spanish, the Cabezona, the Pan de Azucar, and the Smooth Cayenne. Red Spanish is the favourite with the planter, as it has shown good keeping qualities, and shipments have brought an average of \$2.50 per crate, thus allowing a handsome profit to the grower. The good returns from last season's crop have resulted in the planting of a greatly increased acreage, and it is estimated that at least 4,000,000 plants have been set out this year.

The climate of Porto Rico seems to be peculiarly adapted to the raising of pine-apples. Careful cultivation and a little fertilizer show a corresponding increase in the size of the fruit. Several canning factories are now in operation, and as a good supply of fruit is now assured, more factories will soon be erected.

In the majority of the groves the trees are set out 25 feet apart, making about seventy trees to the acre. One advantage of this system is that pine-apples may be planted between the rows for the first two or three years. The principal drawbacks with which the orange growers here have to contend are the wind, scale, and ants; the wind may be overcome by a wind-break, and the scale and ants can be kept within bounds by constant spraying and washing.

SCIENCE NOTES.

Baobab Tree.

The baobab or monkey bread tree (*Adansonia digitata*) is a member of the natural order *Malvaceae*, which contains also the silk cotton tree, as well as cotton, okra, hibiscus, and other useful and ornamental plants. This plant is a native of tropical Africa, and has been introduced into most tropical countries. Specimens are to be seen in most of the West India Islands.

It is one of the largest trees in the world, although it does not grow to a height in proportion to the immense size of its trunk, which sometimes attains a diameter of 30 feet. The fruit, which is a hard-shelled woody capsule is borne on long pendent stalks. The capsule contains a number of cells each filled with a pulpy substance in which the seeds are embedded. The slightly acid pulp is often eaten, while the juice expressed from it has a medicinal value. The pounded leaves are used as a check to excessive perspiration. From the bark a strong fibre is obtained which is used for making ropes.

The Cocoa-nut Flower.

In the *Agricultural News* (Vol. IV, p. 71) a description was given of the structure of the fruit of the cocoa-nut palm (*Cocos nucifera*) and of the germination of the seed. The accompanying illustration (fig. 8) shows the inflorescence of



FIG. 8. FLOWERS AND FRUITS OF THE COCOA-NUT.
(From *The Book of Trinidad*.)

this palm. The yellowish-white flowers, from which the nuts are produced are arranged in spikes, 5 or 6 feet long,

branching from a central axis. The branches bear, throughout the greater part of their length, numerous small male flowers and near their base a single female flower much larger than the male. The flowers are enclosed in a tough, pointed sheath (known as the spathe), 3 or 4 feet in length. The spathe, as shown in the figure, splits on the lower side.

The flowers give rise to bunches containing twelve to twenty fruits.

Coco-de-mer or Double Cocoa-nut.

Several specimens of this interesting palm are to be found in West Indian Botanic Stations, having been obtained from the Seychelles. A note published in the *Agricultural News* (Vol. III, p. 429) indicates some of the uses to which the nuts are devoted.

Mr. George V. Nash contributes an interesting note on the coco-de-mer to the January issue of the *Journal of the New York Botanical Garden*, of which the following is a brief summary:—

This palm is commonly known as *Lodoicea sechellarum*, but it is claimed that *L. maldivica* is the earlier name and should take precedence.

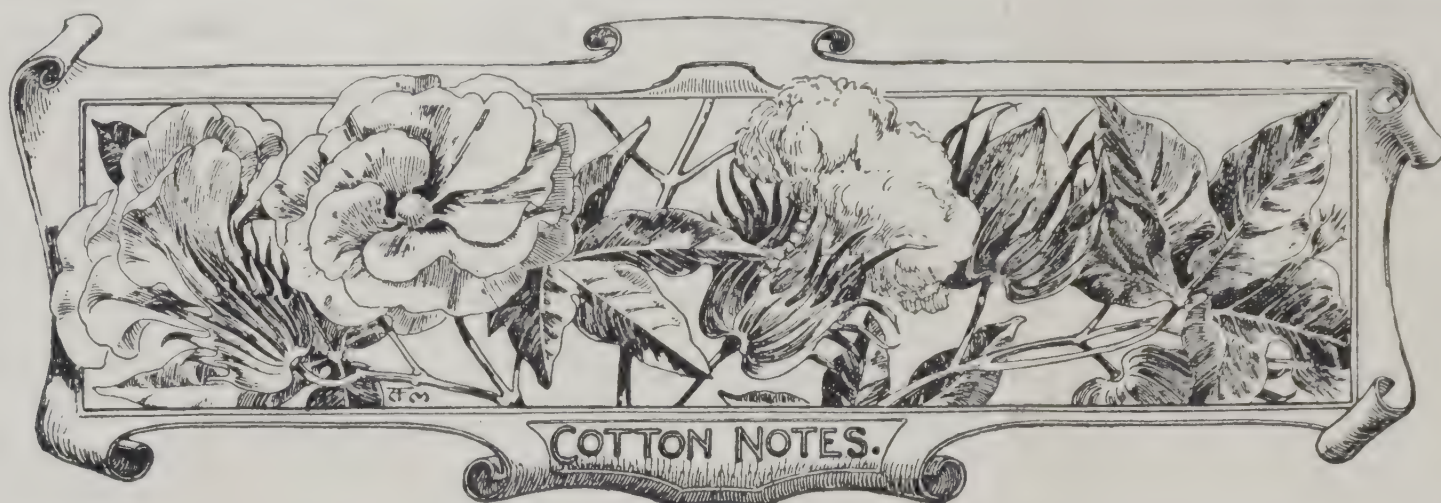
In the Seychelles, in the eighteenth century, this unknown fruit was, on account of its obscurity, accredited with most wonderful properties and given a worth far in excess of its intrinsic value. It was averred that it was not a product of the earth but of the sea, and the Malay and Chinese sailors insisted that it grew on a tree deep in the water off the coast of Sumatra, but that the tree instantly disappeared when they dived down to see it.

Not only did these tales serve to bring the fruit into notice, but its reputed value as an antidote to poisons made its acquisition greatly to be desired by the princes of Hindoostan who were constantly in fear of being made victims of some wily poisoner. They firmly believed that water which had been kept in one of these fruits was purified from all harm and could be drunk with impunity, no matter how active may have been the poison placed in the liquid. But in 1743, upon the discovery of the tree which bore these fruits, this value and repute quickly subsided.

The palm is said to grow upon three of the islands of the Seychelles, occurring in all parts of them, the best trees growing in deep gorges. One such gorge on the island of Praslin is known as the Ravine of the Coco-de-mer, and is said to be one of the most beautiful spots in tropical climes, the trunks of these charming palms rising to a height of 90 or 100 feet, and bearing aloft a crown of magnificent fan-shaped leaves often 20 feet long and 10 or 12 feet wide.

The many economic uses of this palm make it of exceeding value to the natives of the Seychelles. The heart of the crown of leaves is eaten as a vegetable, as is done with the cabbage palm. The leaves, perhaps, are the most important, being used extensively in house building, not only for thatching but also for making walls and partitions; and the down of the young leaves is used in filling mattresses and pillows. The nuts are made into utensils of various kinds, and the young leaves furnish material for making hats.

A remarkable feature of this tree is the length of time required to mature its fruit, ten or twelve years being necessary for this. The fruits are oblong in shape and weigh from 30 to 50 lb., and as sometimes ten of these occur in a bunch, the aggregate weight of such a cluster is considerable. Upon the removal of the outer husk the two oblong nuts are exposed to view, firmly united; it is this character which has given the name of 'double cocoa-nut' to the tree.



SEASONABLE NOTES FOR COTTON GROWERS.

As a result of the recent rains which have fallen in Barbados, agricultural operations are again being put into full swing.

It is unfortunate, however, that the influence of the rains is stimulating some of the planters to put in their seed without thorough preparation of the soil. Too great a hurry in this respect is to be deprecated. It pays much better to till the land well and allow it to 'cool out' for some time before planting is commenced.

Land from which plant canes have been cut has been consolidating in its lower layers during the growing of the cane, the upper layers only being kept in a loose condition during the early part of this period.

It must be borne in mind that the cotton plant is a deep feeder, and that its vegetative period is practically confined to the first three months of its existence. This growing period being so short, it is essential that the soil be thoroughly prepared so that the roots can penetrate it in every direction with the greatest ease. The plant can utilize the food already in the soil and that which may be supplied subsequently, as manure, only when the land has been brought into a state of good tilth.

It is again necessary to draw attention to the undesirable practice of planting cotton in double rows. Some planters appear to be very unwilling to alter their original ideas in this respect, and still continue to put four plants around each cane hole. There is nothing to recommend this practice, while everything is in favour of planting in single rows. Should the season prove to be very wet, the former method might meet with disastrous results, as it would supply exactly the conditions most suitable for the development of fungoid pests.

Planting in single rows need not necessarily decrease the number of plants per acre, while it affords more room for admitting light and air to every part of the plant, as well as giving more space for the weeders, pickers, and any others who may have occasion to pass through the fields. Where double rows are planted, it is practically impossible to pass through the field without breaking off branches, and each broken branch gives an extra opportunity for the entrance of diseases into the plant. Moreover, it is easier to detect the first appearance of the worms, and the Paris green can be applied more satisfactorily when all the plants can be approached on two sides.

The question of how the returns are affected is very important. Where double rows are planted, overlapping is sure to take place, and light and air will be excluded from the lower parts of the plants, with the result that many of the bolls will fall to the ground.

The number of plants to the cane hole must, however, be regulated by the condition of the land; the richer the land the farther apart should the plants be placed.

INSURANCE OF COTTON SHIPMENTS.

The following is an extract from a letter, dated May 29, addressed to the Imperial Commissioner of Agriculture by the Secretary of the British Cotton-growing Association:—

We are prepared to insure any shipments of cotton from the West Indies, which are consigned to us, where same have not already been insured by the consigners, under our open policy with the Marine Insurance Company.

As, however, we cannot tell whether the insurance has been effected or not, unless it is stated in the consigner's letter of advice, or on the bill of lading, we shall be glad if you will kindly inform the planters in the West India Islands that, if they wish us to attend to the insurance of any cotton they may ship, they must specially request us to do so when they advise the shipment, and give us as many particulars as possible respecting same, such as the weight of the cotton, its approximate value, etc. Unless this is done we cannot undertake any responsibility in the event of the cotton being lost or damaged.

WEST INDIAN COTTON.

Messrs. Wolstenholme and Holland, of Liverpool, report as follows, under date of May 29, in regard to West Indian cotton:—

Since our last report on the 15th. instant, a good business has been done in Sea Island descriptions at rather easier prices, owing to the fact that most consumers have liberal supplies, and are only willing to anticipate their requirements at concessions in price.

The bulk of the business has been between 14*d.* and 15*d.*, but it also includes about 20 to 30 bales 'extra fine', 18*d.* to 19*d.*

'Fine' cotton about 16*d.* to 17*d.* is at the moment out of demand.

It is interesting to mention that Porto Rico cotton has been offering at prices from 11*d.* to 13*d.*, but without finding buyers.

The sales included Nevis, 13½*d.* to 15½*d.*; St. Thomas, 13*d.* to 15*d.*; Montserrat, 14*d.* to 15½*d.*; Anguilla, 14½*d.* to 15*d.*; St. Kitt's, 13*d.* to 16*d.*; Barbados, 14¾*d.* to 16*d.*; and Antigua, 14½*d.* to 19*d.*

COTTON AS AN OPENING FOR SMALL CAPITALISTS.

The *West India Committee Circular*, for May 16, has the following note on the cotton industry as an opening for small capitalists:—

Cotton planting takes place in the Leeward Islands from about June to August, and in a short time planters in Antigua, Nevis, and Montserrat will be getting their land ready, so that it is doubtful if any contemplating to go out to the West Indies to embark upon cotton cultivation could be in time for the 1907 crop. In view, however, of the many inquiries which reach us as to the *cur* and *quomodo* of cotton cultivation, we may usefully quote some notes on the subject with which Dr. Francis Watts has kindly furnished us.

There are, he says, openings for young men, of capital ranging from £500 to £1,000, who wish to take up cotton growing. They could probably find land in Antigua, Nevis, or Montserrat. Two or three settlers of this class have already arrived. The proper course to adopt would be to leave for the colony some time between October and November. The embryo planter would then see the cotton crop in progress of growing and reaping. He could inspect the land in several islands and carefully select what suits him best and arrange as to the price without having his hand forced by pressure of time. A little experience of the work, especially if he could attach himself to some cotton plantation, would be useful. It is a difficult matter to assess the value of cotton land, for much of it has been out of cultivation for some time and has ceased to have a definite value. Naturally, owing to the success of the Sea Island cotton industry, prices are rising and should increase still further during the next few years, so that the sooner intending cotton growers make up their minds the better. Land at present fetches from £2 to £5 per acre, or it can be rented at from 10s. to £1 per annum, according to circumstances. There are many hundreds of acres of land suitable in Antigua now unoccupied, and there is also some quantity in Nevis, but it is being taken up. In Montserrat there is a limited amount, while in St. Kitt's there is little or none available, all being taken up with estates' cultivation.

NEW COTTON FACTORY AT BARBADOS.

The following appeared in the *Barbados Advocate*, of June 20:—

The Cotton Company are making extensive preparations for coping with the big boom in the industry which next season is likely to witness. They have just increased their capital by issuing additional shares, all of which have been already taken up, and their recently acquired premises at Friendly Hall are being speedily prepared to meet the forthcoming crop. The building on the Pier Head, which at present does service as a cotton factory, is to be dispensed with at the end of the present season and will be replaced by a structure better adapted for the purpose, the foundation stone of which was laid at Friendly Hall on Monday afternoon last. The new building will be 100 feet in length by 26 feet in breadth, and will consist of three storeys. The top floor will be fitted up for the reception of the seed-cotton, whence it will be let down to the second floor, where the ginning will take place. In addition to the six gins now in use at the old factory, the Company have eighteen other gins on order, and these will all be erected in two rows of twelve each in this part of the building. The old engine now in use at the Pier Head will be dispensed with, and a larger one

capable of working the twenty-four gins substituted. The factory will be fitted with a large hydraulic baling press and other up-to-date appliances for handling the cotton. The cotton seed, after having been separated from the lint, will be received on the third floor. The Company are in possession of a disintegrator for converting the seed into meal, but it is not proposed to carry out any extensive operations of this kind for the present. Later on, the building at the Pier Head will be removed to Friendly Hall and used as a store room.

The forthcoming cotton crop bids fair to be an unusually large one. The estimate made by the Imperial Department of Agriculture was that the area to be planted this year would be about 5,000 acres, but there is every indication that this estimate will be exceeded. Hundreds of pounds of seed are daily being delivered by Mr. Bovell, even some of the most strenuous opponents of the industry having been brought to take a different view in consequence of the steady decline in the sugar market and the remunerative prices obtained by growers of cotton during the past few years. The Company hope to have the new factory ready to meet the next reaping season, which begins in November. They estimate that, with the equipment provided, it will be possible to dispose of a crop of 5,000 acres in about three months. One gin is ordinarily capable of dealing with 2,800 lb. of seed-cotton a day, turning out 600 lb. of lint, which is baled and got ready for shipment as soon as it is ginned. In view of the steady advance which the industry seems to be making, the Company will probably soon find it necessary to increase the capacity of the factory in order to cope with the increased demands likely to be made on it. The site of the factory, it may be noted in conclusion, is hardly less central than the old one, and is much more convenient in every respect for the purpose for which it is intended.

THE GINGER MARKET.

The *Journal of the Jamaica Agricultural Society*, for May, has the following note on the ginger market:—

After long depression in the price of ginger, the markets became almost entirely empty, and accordingly this year there has been a great demand for it, and the price has risen to something like what it was ten years ago. The crop here is not a large one, for not only was there less planted out than usual, but the yield has not been much. It seems therefore that the keen demand is likely to continue. So prices go up and down in response to the law of supply and demand. When there is a large supply the best of everything is always in demand.

Inoculation for Leguminous Crops. Reporting in the *Journal of the Royal Agricultural Society of England* (Vol. 66) on experiments with inoculating materials for leguminous crops, Dr. J. Augustus Voelcker concludes, as the outcome of the year's experience, that, 'as regards the ordinary leguminous crops that the English farmer would grow, there has been nothing brought out to show that the inoculating materials, now distributed, are likely to be any more successful, practically, than they were when originally introduced nearly twenty years ago.' The experiments were carried out at the Society's station at Woburn with (1) German preparations sent direct from Dr. Hiltner, of Munich, and (2) the American preparations received from Dr. G. Moore, of the U. S. Department of Agriculture. The former comprised materials for peas, beans, tares, and red clover; the latter for melilotus and soy bean only.

EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming, should be addressed to the Commissioner, Imperial Department of Agriculture, Barbados.

All applications for copies of the 'Agricultural News' should be addressed to the Agents, and not to the Department.

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Agricultural News

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NOTES AND COMMENTS.

Contents of Present Issue.

Rice growing in British Guiana forms the subject of the editorial in this issue of the *Agricultural News*. This industry has developed considerably within the last few years, good prices are being obtained for the product, and the outlook is therefore most encouraging.

Extracts from a progress report on sugar-cane experiments in British Guiana appear on p. 195.

Hints on the cultivation of lemons are given on p. 196. These are followed by a note on pine-apple growing in Porto Rico.

The attention of cotton growers is directed to the 'Seasonable Notes' on p. 198. The necessity for the thorough preparation of the soil before planting and the desirability of planting in single rows are particularly dealt with. The extension of the cotton industry at Barbados is the subject of a note on p. 199.

Two illustrated articles on insect pests are published on p. 202.

The article on the prevention of yellow fever is concluded on p. 203.

On p. 205 will be found an article on the cultivation of okras. The writer deals also with the gathering of the fruits and their uses.

Page 207 contains a note on the use of sugar-cane as shade for young cacao plants and a report on salt from Turks Islands.

Fruit-canning Factory in Jamaica.

In reference to the note in the *Agricultural News* (Vol. V, p. 153) on fruit canning, Mr. G. Loutrel Lucas, of the Norbrook Canning Factory, Jamaica, writes as follows:—

I desire to correct the impression that there is no canning factory in the West Indies and announce for the first time in public print that Jamaica can boast of the largest and finest-equipped canning factory in the West Indies, which has been running since January 15, 1906, and we are working at full capacity every day and shall continue to do so during the year.

Sources of Commercial Rubber.

The Cantor lectures on the 'Sources of Commercial India-rubber,' delivered by Sir Daniel Morris, K.C.M.G., before the Society of Arts, in 1898, have been out of print for some years. As the demand for these lectures still continues, the Society of Arts has reprinted them in their original form and without alteration.

It may be mentioned that the lectures were given with special reference to the rubber industries connected with the British Colonial and Indian possessions. They deal fully with the cultivation of the principal rubber-yielding trees, for example, the Central American (*Castilloa elastica*), Para (*Hevea brasiliensis*), Ceara (*Manihot Glaziovii*), etc., etc.

With the view of encouraging rubber planting along the best lines, Sir Alfred L. Jones, K.C.M.G., is distributing gratis 500 copies of these lectures.

Permanent Exhibition Committees.

It is gratifying to note that the suggestion, originally made in the *West India Committee Circular* and supported by the Imperial Department of Agriculture, that Permanent Exhibition Committees should be appointed in the West India Islands, has met with a hearty response. It was considered that such committees 'might undertake the arrangements for all the exhibitions and thus obviate the necessity of appointing a fresh committee to deal with each case as it arises.'

The first society to adopt this suggestion was the Agricultural and Commercial Society of Grenada, which appointed a Permanent Exhibition Committee about twelve months ago. The appointments of similar bodies in Barbados, St. Lucia, St. Vincent, and Dominica have been noted in recent issues of the *Agricultural News*.

The committee recently appointed by the Agricultural and Commercial Society of Antigua is composed of the Hon. Dr. F. Watts, C.M.G. (Chairman), Mr. R. Bryson, Mr. A. P. Cowley, and the Hon. D. McDonald (Hon. Secretary). Montserrat has a Permanent Exhibition Committee, with Mr. C. Watson as Chairman and the Curator of the Botanic Station as Honorary Secretary. At a meeting of the Agricultural and Commercial Society of St. Kitt's, held on April 5, it was decided to appoint a similar committee to undertake to get together and forward exhibits to the Canadian Exhibitions to be held this year.

Jamaica Pimento Market.

As suggested in an editorial in a recent issue of the *Jamaica Daily Telegraph*, the vagaries of the quotations for pimento in the English and American markets show the necessity that exists for greater co-operation among producers and shippers in the West Indies.

It appears that pimento was quoted recently in London and New York at 2½d. per lb., and yet a firm offer to buy 500 bags at 2¾d. was refused on the ground that purchases could not be effected at less than 3d. per lb. This seems to indicate that London merchants are now holding stocks until they can get 3d. per lb. for what they purchased from Jamaica exporters at a trifle over 2d. per lb. The *Daily Telegraph* suggests that Jamaica growers and produce buyers should enjoy the benefits of a rising market by combining to regulate both supply and price.

The exports of pimento from Jamaica amounted in the year 1904-5 to 154,336 cwt., or, at 150 lb. to the bag, to over 100,000 bags. Last year was a record one as far as the output of pimento was concerned, but a crop of 80,000 bags is not unusual.

Tannin Materials in Jamaica.

The *Quarterly Journal* (Vol. I, no. 2) of the Institute of Commercial Research in the Tropics, Liverpool University, contains a report, by Dr. M. Nierenstein, on the tannin materials and manufacture of leather in Jamaica.

'The following plants yielding tannin materials are stated to occur in the island: *Acacia Catechu*, *Bauhinia variegata*, *Caesalpinia coriaria* (divi-divi), *Laguncularia racemosa* (white mangrove). Of these, "divi-divi" pods and the barks of the red and white mangrove appear to be in regular use in the colony. There appears to be a small export trade in tannin materials; thus, in 1903, 478 tons of divi-divi pods were exported, principally to Germany, France, and the United Kingdom, and in the same period 133 tons of bark were exported, part of which was probably bark for tanners' use.'

Mention is also made of such tannin-yielding plants as *Cassia Fistula*, *C. siamea*, and *Terminalia Catappa*, which also occur in Jamaica.

It is suggested that the so-called 'bastard' logwood trees, which contain no dye stuff (see *West Indian Bulletin*, Vol. V, pp. 249-58), might find use in supplying tannin material.

Citrus Fruit Industry in California.

In the *Consular Report* on the trade of the states California, Nevada, etc., it is stated that the citrus fruit season of 1904-5 proved to be a record-breaker in respect to the size of the output, the production being over 2,000 car-loads in excess of that of the previous year. During the year ended October 31, 1905, the exports of oranges and lemons reached the grand total of 31,422 car-loads.

The unusually heavy production is attributed to exceptionally favourable weather. Many new orchards also came into bearing, while insect pests did comparatively little damage.

In the case of lemons, sales were stimulated by the falling off in the Mediterranean crop. 'A few years ago, when the lemon industry in this state was in an unsatisfactory condition, many growers expressed the intention of cutting down their trees and grafting them to oranges. With the results of the past season in evidence, it is hardly probable that any such work will be done.'

Cocoa-nut Industry in the Philippines.

In the report on the Philippine Bureau of Agriculture for the year ended August 31, 1905, interesting observations are made on the cocoa-nut industry.

In the Tayabas province the average amount of copra yielded by 1,000 nuts is 138 lb. In some districts this yield is exceeded, while in the Laguna province the average yield is hardly more than half that amount. The differences in yield are due in part to soil and more largely to variations in the distribution of the rainfall. One man can, on the average, husk and break 1,000 nuts per diem.

Efforts are being made to equip a larger number of estates with plants for grinding the green nuts, as it is found that the local demand for the fresh nuts is confined to the fancy grades. About one-third of the husks are consumed in copra drying and as domestic fuel; the remainder are buried.

The output of copra is steadily increasing as new trees come into bearing, the total amount exported in 1904 being 85,036,514 lb.

Exports of Java.

As will be seen from an extract from the *Consular Report* on the trade of Java for 1905, published elsewhere in these columns, the production of sugar showed a decrease. In spite of this, the year under review may be regarded as a satisfactory one. Against a smaller crop must be placed the very remunerative prices realized by planters for this product as well as for tobacco. The crops of the latter were satisfactory and there was a brisk demand.

The coffee crop exceeded the estimates, an increase in the crop of Java coffee of over 7,000 tons, as compared with 1904, being reported. The production of Liberian coffee showed a decrease of 1,500 tons.

The year's rice crop, taken altogether, may be regarded as a fair one as regards both quality and quantity. The exports of Java tea were about 400,000 lb. more than in 1904.

Principally owing to the fact that the Government are encouraging the extension of cocoa-nut gardens among the natives, the production of copra in 1905 showed an enormous increase over previous years. The planting of indigo has still further diminished in consequence of the great increase in production of the synthetic article.



INSECT NOTES.

The Cacao Beetle.

Fig. 9 shows the cacao beetle (*Steirastoma depressum*) and its grub. The latter makes tunnels through the wood of the cacao tree. A full description of this insect and its habits was given in an early issue of the *Agricultural News* (Vol I, p. 9), and more recently in the *West Indian Bulletin* (Vol. VI, pp. 94-5), where Mr. H. A. Ballou deals as follows with the remedies to be adopted:—

‘The larvae and pupae may be dug out of the tree when their presence is known, or they may be killed by probing the tunnels with a stout wire. When



FIG. 9. CACAO BEETLE AND GRUB.

(Both natural size.)

any wounds are made in the tree, however, they should be promptly tarred over to prevent the entrance of fungi. The adult beetles are active by night, and may be found resting on the trunks and larger branches of the cacao tree in the early morning. At this time they may be collected and, if thrown into tins of water, to which a little kerosene has been added, they will be quickly killed. In Surinam it is the common practice to tie large pieces of the bark of the silk cotton tree on the trunks of the cacao to furnish a hiding-place for the beetles. They may be collected from these places during the day. It would seem likely that strips of burlap (bagging), tied round the trunks, would have the same effect and furnish convenient places for collecting these beetles.’

Mr. G. F. Branch, Agricultural Instructor at Grenada, states, in a recent report, that he found a large number of these beetles at work on a bread-nut tree (*Brosimum Alicastrum*) which had been previously felled. Mr. Branch suggests that this tree, in addition to those already known, such as the silk cotton, might be utilized as traps and then destroyed by fire.

The Cane-fly.

The cane-fly (*Delphax saccharivora*) has frequently been mentioned in the publications of the Imperial Department of Agriculture, and in a recent number of the *Agricultural News* (Vol. IV, p. 314) a brief account of this insect was given.

The cane-fly is a small insect of the Hemiptera-Homoptera. The mouth parts are adapted for piercing and sucking. The eggs are laid within the tissue of the cane leaf. The female is provided with a saw-like ovipositor by means of which the epidermis of the leaf is cut and the eggs embedded in the leaf. They are covered with a white, flocculent, waxy substance, which is plainly to be seen in the accompanying illustration (fig. 10), which is from a photograph taken in Barbados during the past season.

The young cane-flies are wingless and are to be found on the under side of the cane leaf. The adults are winged and when disturbed quickly take flight.



FIG. 10. SUGAR-CANE ATTACKED BY THE CANE-FLY.

An attack of this pest is usually accompanied by black blight, which is frequently the first intimation the planter has of the presence of the cane-fly.

Weevil on Camphor Trees.

The *Bulletin of the Department of Agriculture*, Jamaica, for May, contains the following letter received by the Director of Public Gardens and Plantations from Dr. L. O. Howard, Chief of the Bureau of Entomology, of the U. S. Department of Agriculture, in regard to a weevil which was killing the camphor trees at Cinchona, but has not been noticed on any other trees:—

I have received yours of the 7th. instant, with specimens of larva and beetle found attacking young camphor trees at the Botanic Garden at Cinchona.

Mr. Schwarz reports that the weevil is *Hilipus elegans*, Guérin, of the family Curculionidae. There are several hundred species of this tropical or sub-tropical genus known from Central and South America, including a few species from the West Indies. Your species is not a native of the West Indies, but has been manifestly imported during recent times from some part of Central America, where the insect is said to be quite abundant.

Nothing is known of the habits of any of the species, but, since the genus *Hilipus* is closely allied to our northern pine weevils, it may be inferred that they live under the bark of various deciduous trees. I am not able to give you any remedial measures, but any camphor tree that shows the least sign of being affected by the weevil should by all means be uprooted and burned.

Mr. Fawcett suggests that, if, as supposed by Dr. Howard, this insect pest has been imported in some way from Central America, it is an additional proof of the necessity of stringent precautions against such importations by means of careful fumigation, as is now being practised in most of the West India Islands.

THE PREVENTION OF YELLOW FEVER.

(CONCLUDED.)

The following concludes the article on the prevention of yellow fever commenced in the last issue of the *Agricultural News* (p. 187):—

12. The *Stegomyia* mosquito attacks its victim noiselessly and persistently both during the day time and at night. Therefore it is necessary:—

- (1) Always to sleep under a properly made and securely tucked-in mosquito net, of a gauge of 18 meshes to the inch. The net should always be tucked in under the mattress and not hang on the floor. There should be no slit in the side and no holes. Take care that the arms and legs are not bitten during sleep, through coming in contact with the net.
- (2) To remember that a considerable number of cases of infection occur through trusting in nets of the wrong gauge, imperfectly secured, badly made, or containing holes.
- (3) That, where possible in mosquito-infected districts, one living room, a portion or whole of the verandah, or the whole house be screened. Sleeping in the afternoon without a net is as dangerous as sleeping at night without one.
- (4) That as the mosquito avoids currents of air, the freer the through draft of air the better.

13. In towns liable to yellow fever all sections of the community should co-operate with the sanitary authority in bringing to light the first case or cases of yellow fever, in order that prompt measures may be undertaken at once.

Early notification is essential to early stamping out of the disease.

The period of incubation in man, that is, the time elapsing after a person has been bitten by an infected mosquito and the onset of symptoms, is approximately five days.

14. A patient suffering from yellow fever is capable of infecting mosquitos during the first three days of the attack. If bitten by a *Stegomyia* during this period the mosquito becomes itself infected, and after the lapse of a period of some ten days is capable of transmitting the disease to a healthy person.

The power which an infected mosquito possesses of transmitting yellow fever has been demonstrated to persist for many weeks (a period of 154 days is recorded). The bite of a single infected mosquito is sufficient to cause an attack of yellow fever. During the cold season, although the mosquitos may not be active and bite, they may remain quiescent in some parts of the house, and upon the advent of warm weather, become active, and if infected in the previous year, be capable of transmitting infection and starting a fresh epidemic.

15. The following precautions must be adopted in case of infection or in any suspicious cases:—

- (1) The patient must at once be properly screened in order to prevent the access of mosquitos. Where there is any doubt as to the true nature of the fever, screen the patient until the diagnosis is firmly established.
- (2) The room which the patient occupies should at once be screened to prevent the egress of any infected mosquitos.
- (3) The other rooms in the house, outhouses, base-

ments, and closets should be thoroughly fumigated to destroy all mosquitos.

It would be better, however, to remove the patient to a proper isolation hospital and thoroughly to fumigate the whole house

- (4) All houses, outhouses, and offices in the immediate vicinity should be thoroughly fumigated.
- (5) If the epidemic is spreading, general fumigation of the town should at once be undertaken by the sanitary authority with the co-operation of the citizens.
- (6) To be efficient, fumigation should be done by experts only, as it is most essential thoroughly to stop all apertures in the room.

Infected mosquitos can readily escape through very small chinks.

No matter how large the openings in the verandahs or rooms, they can be readily closed with paper by men possessing skill.

(7) The fumigating materials used are as follows:—

- (1) *Sulphur*.—Allow 2 lb. of sulphur to 1,000 cubic feet. Use two pots, place them in a pan containing 1 inch of water to prevent damage and set fire to the sulphur by means of spirit.

Duration.—Three hours.

- (2) *Pyrethrum*.—Allow 3 lb. to 1,000 cubic feet and divide amongst two or three pots, using the same precautions as with sulphur.

Duration.—Three hours.

- (3) *Camphor and Carbolic acid*.—Equal parts of camphor and crystallized carbolic acid are fused together into a liquid by gentle heat. Vaporize 4 oz. of mixture to each 1,000 cubic feet; this can be done by placing the liquid in a wide shallow pan over a spirit or petroleum lamp; white fumes are given off. To avoid the mixture burning, the fumes should not come in close contact with the flame of the lamp.

Duration.—Two hours.

Remember that sulphur tarnishes metal work and injures pianos, sewing machines, chronometers, telephones, etc.

The camphor-carbolic mixture is one of the most agreeable and effective of the various agents.

Fumigation of Imported Plants. To guard against the possible introduction of diseases, there is only one safeguard, and that is thorough and systematic control of all plant importations. For some time past, the various administrations of the South African colonies have been conferring with the object of agreeing upon uniform regulations for this purpose, and it is hoped that, before long, this will be promulgated. It may appear unnecessary to some to place restraints upon the introduction of grafts and stocks, but when they consider how great the risk of infection is, and what enormous damage would be inflicted upon our fruit industry, were further infections introduced from overseas, there can be no doubt as to the right course to follow. (*Agricultural Journal* of the Cape of Good Hope, April 1906.)



GLEANINGS.

The *Dominica Guardian*, of June 1, stated that the shipment of green limes by the S.S. 'Trinidad' on the following Tuesday was likely to beat all previous records. It is stated that over 4,000 barrels were ready for shipment.

There will shortly be several vacancies at the Agricultural School at Dominica. Parents or guardians who wish to enter boys in this school should apply to the Curator of the Botanic Station.

Seeds of the California palm, *Washingtonia filifera*, to which reference was made in the *Agricultural News* (Vol. II, p.28), have been received from the Agricultural Superintendent at Grenada, and will be distributed throughout the West Indies.

The Agricultural Superintendent at Grenada reports that plots of what is known as 'twelve-week' corn have been grown at the Botanic Station for the supply of seed for distribution. There is some demand for this corn among the peasants, who hold that it has several advantages over the more common kind generally planted.

According to the *Cotton Trade Journal*, the uneasiness caused by the drought in the Sea Islands is now over, and planters will therefore be looking to getting stands ready for cultivation. From all indications, the Sea Island acreage, on the whole, will not be far from what it was last year, notwithstanding claims to the contrary.

'Whereas it is of vital importance for the conservation and promotion of the rainfall and water supply in the island of Grenada that the forest growth in the vicinity of the Grand Etang should be maintained and preserved,' an Ordinance has been passed to provide for the preservation of forest growth in that vicinity.

According to the *Consular Report* on the trade of the Azores for the year 1905, the exportation of pine-apples continues to increase. 'Last year 48,917 cases containing 433,658 pines, were exported to the London market, and 79,249 cases, with 873,575 pines, to Hamburg, being a total of 1,307,233 pines, valued by the custom authorities here at £87,148.'

The Police Magistrate for the western district of Grenada reports that the shortness of the cacao crop, the fall in prices, the disinclination of the money lender to grant any further indulgence, and the consequent inability of the peasant proprietors to meet their engagements, are rapidly conducing to the probable early extinction of peasant proprietors in the district.

It is desirable to correct an error in the last issue of the *Agricultural News* (p. 182), where it was stated that the Acme Powder Bellows were obtainable from Messrs. Gillespie Bros. & Co. at about \$3.00 per dozen. This should read \$8.00 per dozen.

It is notified for the information of planters in Dominica that seed of the *Castilloa* and *Funtumia* rubber trees will be ready for distribution during June and July. Early application should be made to the Curator of the Botanic Station.

It is stated in the *Consular Report* on the Omoa and Puerto Cortés district of the republic of Honduras that the exports of coffee, sarsaparilla, and rubber have fallen off in quantity in consequence of the difficulty of procuring cheap labour, as the natives can obtain better wages on banana plantations. The number of bunches of bananas exported to the United States last year amounted to 2,058,896.

The drug known as *Cascara sagrada* is obtained from the bark of *Rhamnus Purshiana*, a shrubby tree abundant in the states of Oregon and Washington. According to the *Consular Report* on the trade of these states in 1905, only 750 tons were exported, owing to a lessened demand. It is considered fortunate for the preservation of the trees that the prices paid two years ago were not permanent.

It is estimated that the output of honey from California in 1905 was 10,000,000 lb. Throughout the entire season the demand was active at fair prices. Several car-loads have been sent to Europe, and the eastern states have drawn on this market on account of short supplies having been received from the West Indies. (*Consular Report* on the states of California, etc., 1905.)

The annual report of the Royal Mail Steam Packet Company states: 'With a view to co-operating with the Imperial Department of Agriculture for the further development of the fruit industry in the West Indies, four of the five West Indian transatlantic passenger steamers have been provided with cold storage for the conveyance of fruit. The fifth steamer is being similarly fitted, and will be completed before her next departure to the West Indies.'

In reference to the efforts that are being made in Trinidad to introduce labour-saving appliances in cane cultivation, it may be of interest to mention that the New Colonial Company, Ltd., has permanent derricks at various points on the estates for hoisting canes into trucks. In the *Port-of-Spain Gazette*, of June 3, mention is made of an improved appliance at work on the railway on La Fortune plantation in the form of a moveable derrick. It has a radius of 24 feet and lifts a load in any position.

Reference was made in the last issue of the *Agricultural News* (p. 186) to the Grecian trade in citrons in brine. It is stated in the *Consular Report* on the Cyclades (Greece) for the year 1905 that 'the export of citrons in brine was above the average.' The report continues: 'This article and emery stone are the only items of importance in the export trade of Syra. As usual the largest proportion of citrons was sent to America, amounting to 3,097 casks, valued at £17,913.'

CULTIVATION OF OKRAS.

The U. S. Department of Agriculture has recently issued, as *Farmers' Bulletin* No. 232, a paper entitled 'Okra: its Culture and Uses.' As the okra is commonly cultivated in the West Indies, the following extracts from this paper are likely to be of interest:—

Okra, or gumbo, as it is commonly called (*Hibiscus esculentus*), is a tropical annual belonging to the order *Malvaceae*. This order includes some important economic plants, of which cotton and okra have the greatest commercial value, and such ornamentals as the abutilons and many varieties of hibiscus. The okra plant somewhat resembles the cotton plant, though having much larger and rougher leaves and a thicker stem. Its flowers are similar to those of cotton in size, shape, and colour, are always single, and there is very little variation between those of different varieties.

The original home of the okra plant is not definitely known, but it is either Africa, the West Indies, or Central America.

The soil upon which okra can most successfully be grown is a rich, mellow loam, ploughed rather deeply and well worked over with pulverizing tools. The same conditions that will produce good cotton or corn will be found suitable for the production of okra.

PLANTING THE SEED.

Plant in rows, $3\frac{1}{2}$ feet apart for the dwarf types, and $4\frac{1}{2}$ feet for the larger-growing varieties. Scatter the seeds in drills, or plant loosely in hills, as with corn, and cover to a depth of 1 or 2 inches, according to the compactness and moisture content of the soil. The seeds may be planted with any good seed drill, but, when placed in hills, they should be separated 3 or 4 inches to allow space for the development of the stems.

CULTIVATION.

As soon as the plants are well established, they may be thinned to three or four in a hill, or, if grown in drills, to 12 or 14 inches for the dwarf and 18 to 24 inches for the larger-growing varieties.

Where vacant spots occur from failure in germination, they may be filled in by transplanting. Cultivate as in the case of corn or cotton, keeping the ground well stirred and the surface soil loose, especially while the plants are small. After the leaves begin to shade the ground, very little cultivation is necessary except to keep the land free from weeds.

A poor soil and insufficient moisture will yield pods of inferior size and quality, and irrigation may often be desirable in order to produce a marketable crop.

The okra plants will usually continue to grow until late in the season, but after a time the pods are not so large or tender as those produced earlier. As the pod is the only part of the plant ordinarily used for food, it is desirable to secure a rapid and continuous growth in order to produce the greatest quantity of marketable pods.

GATHERING AND MARKETING.

As soon as the plants begin to set fruits, the pods should be gathered each day, preferably in the evening. The flower opens during the night or early morning and fades after a few hours. The pollen must be transferred during the early morning, and the pod thus formed will usually be ready for gathering during the latter part of the following day, although the time required to produce a marketable pod varies according to the age of the plant

and conditions under which it is grown. The pods should always be gathered, irrespective of size, while they are still soft, and before the seeds are half grown.

USES OF OKRAS.

The principal use of okra is in soups and various culinary preparations in which meats form an important factor, as in the so-called gumbo soups, to which the young pods impart an excellent flavour, besides giving a pleasant mucilaginous consistency. The young seeds are occasionally cooked in the same way as green peas, and the very young and tender pods are boiled and served as a salad with French dressing. Both the stem and the mature pod contain a fibre which is employed in the manufacture of paper.

In countries where large quantities of the pods are consumed, they are dried and preserved to be used during the part of the year when a fresh supply cannot be obtained. There are several methods of drying the pods. By one of these the pods are cut into slices crosswise and about $\frac{1}{2}$ inch thick; the slices are then spread upon muslin-covered frames and dried, after which the okra is stored in thin bags until required for use. By another and a more common method, the very young pods are strung upon coarse threads and hung up to dry. In Turkey alone there are tons of the pods preserved in this manner each year.

No copper, brass, or iron cooking vessels should be employed in preparing okra, as the metal will be absorbed and the pods discoloured or even rendered poisonous. The cooking should be done in agate, porcelain, or earthenware.

TRADE BETWEEN CANADA AND THE WEST INDIES.

In view of the efforts that are being made to extend the trade between the West Indies and Canada, by means of exhibitions of West Indian products and otherwise, the following extract from the *Maritime Merchant* (Montreal), of May 17, is of interest:—

We have before us the figures of the trade between the several West India Islands and Canada for the years from 1900 to 1904. These show a startling increase, and while we have not the official returns for 1905, it is well known that the trade of that year was much larger than ever before. With the growth of population and a continuance of the efforts to develop the sale of Canadian produce and manufactures in the tropics, there is no reason why the present rate of increase should not be maintained for many years, until Canada supplies the larger part of the needs of these colonies, which she can do as well as the United States.

These figures, while fairly large, are exceeded by the imports from other countries, notably the United States. There is, therefore, room for a considerable expansion of the sales of Canadian goods. The merchants of the West Indies are willing purchasers of such Canadian goods as meet their requirements.

New Uses for Balata. Mention is made in a recent issue of the *India Rubber World* of the extension of the uses of balata. 'There is no doubt that balata belting is increasing in popularity; though it is not suitable for hot situations, it is certainly superior to leather where continuous damp has to be reckoned with, and the facility with which joints can be made, yielding a smooth surface, has popularized the belt for dynamo running.'



GUAVA FRUIT PULP.

As in the West Indies, so in the Hawaiian Islands, the guava tree has a remarkable capacity for taking possession of pasture land or land that has been thrown out of cultivation. Very little use is, however, made of the fruits in Hawaii, and enormous quantities are allowed to go to waste. A writer in the *Hawaiian Forester and Agriculturist* for April states:—

This might all be used to profitable advantage if a system of fruit pulping were introduced similar to that which is employed in many of the agricultural districts of France. The general scope of the method suggested is for the local growers or pickers to preserve the guava pulp in large containers, by an inexpensive and simple plan, and in this form to send it to a central jelly factory for future use.

The pulping is, in France, usually conducted on a large scale, but it should also be as easily and advantageously carried on with smaller quantities of fruit. The apparatus used consists merely of a copper pan and a metal tank. The fruit to be pulped should, after removal of the rind, be placed in the copper pan and heated to boiling, during which process it should be continually stirred with a wooden spoon. After boiling for a sufficient time it should then be emptied into tin containers which are soldered up. The tins are then removed to the metal tank, in which they are immersed in boiling water for about twenty minutes. During this process, if any of the tins are not sufficiently soldered, it will be detected, and in this case they must be removed.

The quality of the product depends on the degree of cleanliness observed, in the care which is exercised to prevent burning during the process of boiling, in the kinds of tins employed, and in the manner of soldering. If thoroughly cleansed, kerosene tins could be employed. The cost of producing the fruit, to which must be added the freight to a central factory, should not be more than from \$1.75 to \$2.15 per 100 lb. The best quality of pulp is obtained in France by steam heating instead of fire directly applied to the pans. This method is desirable with the more delicate kinds of fruit, such as the apricot and peach, but it should not be necessary in the case of the guava if sufficient care is taken. As a rule, a small quantity of water, varying with the kind of fruit used, and which may be easily determined, is added to the pulp to assist in preventing burning. There seems in this proposed industry to be a splendid field for a man of small capital to establish a central jelly factory in Honolulu and to supply it with fruit pulp from a few pulping plants situated in favourable districts.

DEFECTS IN OSTRICH FEATHERS.

The *Agricultural Journal* of the Cape of Good Hope for May contains an interesting paper on 'Bars in Ostrich Feathers,' by Dr. J. E. Duerden, Professor of Zoology, Rhodes University College, Cape Colony, who was for some years Curator of the Museum at the Jamaica Institute. Dr. Duerden also contributes a letter on the subject to *Nature* (May 17, 1906). He says that 'barring,' which takes the form of a series of narrow, chevron-shaped bars or malformations across the whole feather, has, of recent years, caused much concern to the farmer, as it seriously reduces the value of the plumes.

It appears that 'barring' represents some interference with the normal growth of the plume in its early stages. Evidence mainly points to impaired nutrition of the feather germ as the cause. 'In a general way it is recognized that the better fed the bird the less likely are its feathers to show any defects.'

Dr. Duerden thinks there is good reason for expecting that the remedy will be found to be mainly a question of a proper and regular supply of food—not an easy matter in time of drought. 'Artificial selection in breeding may also assist towards the production of a strain in which the feathers are less influenced by constitutional changes in the bird.'

KOLA IN THE GOLD COAST.

The Director of Agriculture for the Gold Coast Colony has recently issued a précis of a report by Dr. Gruner, District Commissioner, Togoland, German West Africa, on a visit made by him to the Gold Coast in August 1903, for the purpose of acquiring information relative to the cacao and kola industries. The following notes on kola are likely to be of interest:—

The kola tree is very seldom planted, and the tending of those trees produced by natural agency is limited to the clearing away of bush and weeds; but every such tree has an owner, who claims this right in virtue of having affected the first clearing.

Kola trees raised from seed commence to fruit when six or seven years old; produce is small at this period but increases yearly until the tree is mature, when it will yield from forty to fifty fruits.

Two crops are produced annually, in December and April, of which the former is the principal. Fruits which fall off the trees are not collected as they spoil rapidly; those plucked from the trees are stored in the shade, as the hot sun turns them black. When the nuts are freshly gathered some difficulty is experienced in skinning them but if they are stored for a short time the skin can be readily removed with the fingers. If the nuts harvested exceed the demand, the surplus is skinned and packed, with the leaves of a particular plant (*Thaumatococcus Danielli*), in broad baskets made of palm leaves, and stored.

The Hausas, who are the principal consumers, convey salt to the kola districts and barter it for kola; 1 lb. of salt valued at 6d. being exchanged for 100 kola nuts. The price of kola in the districts where it is produced fluctuates between 3d. and 1s. per 100 nuts, but in Accra, cost of transport raises it to 1s. 6d. per 100. Kola is principally exported by sea to Lagos; the values of the exports in 1900 and 1901 were £43,133 and £35,024, respectively; * while the estimated annual value of the exports overland to the hinterland is £75,000.

The principal kola markets in Akim are Insuaim, Essamang, Kwaben, Tumfa, and Kankan. In Kwaben or Tumfa, it is possible to purchase from a single person ten loads containing 2,000 nuts each. Previously the kola produced in Ashanti was only purchased by Hausas and transported by them northwards to the Hausa States; but the restoration of order in Ashanti and the completion of the railway to Kumasi have facilitated the transport of this crop to the coast.

* The trade in kola nuts in the Gold Coast has shown a steady improvement since 1902, the total value of the exports in 1904 being £54,763. [Ed. A. N.]

SUGAR-CANE AS SHADE FOR YOUNG CACAO PLANTS.

Many cacao plantations have in the past been established by the planting of the young plants among sugar-cane. Whether this is a desirable practice is doubtful; for, whereas sugar-cane affords good shade for the young cacao during its growing season, it is practically useless in dry weather. It is probable, therefore, that all young cacao plants, when sugar-cane is used for shade, will suffer more or less from exposure during the reaping season, and that other plants, such as the pigeon pea, banana, tannia, or dasheen, might successfully offer better shade to the young plants.

The following extract from a note on this subject, forwarded by Mr. Joseph Jones, Curator of the Botanic Station, Dominica, may be of interest:—

The important point in establishing cacao is that the planter must allow sufficient room for the development of the young plants. If he allows sugar-cane to cover the plants, they receive a severe check when the former is cut. Probably, a better shade for young cacao is afforded by tannias and bananas, but, in the case of tannias, little protection is offered by them in the dry season, and, therefore, it is advisable to give the young cacao plants a good mulch of leaves at the commencement of the dry season to make up for the lack of shade.

A further note by Mr. Geo. S. Hudson, Agricultural Instructor, St. Lucia, deals with the same subject:—

The sugar-cane is one of the most unsuitable shade plants for young cacao, not only on account of sudden exposure to wind and sun, when the canes are cut, but also because it ties up the soil by a mass of fibrous roots.

Some 300 to 400 acres of sugar-cane at Roseau have cacao planted in it. Most of the trees are ten years old and have not yet borne a single pod.

In places where there is a demand for sugar-cane, but it is desired to make cacao the permanent crop, a double row of canes, 2 feet apart, might be planted up a central line between every two rows of cacao, and plantains or bananas between each cacao plant in the cacao row. This plan could be safely continued for two years.

As the cultivation of cacao is considerably increasing throughout the West Indies, it is desirable that the most economic establishment of the plantations should be adopted, and therefore careful attention should be given to the choice of shade for the young cacao plants.

SALT FROM TURKS ISLANDS.

His Honour the Administrator of Dominica has forwarded for publication in the *Agricultural News* the following report on salt from the Turks Islands, by Professor Wyndham R. Dunstan, M.A., F.R.S., Director of the Imperial Institute:—

This sample of salt was brought to England by the Commissioner of the Turks Islands and was received at the Imperial Institute in October 1904. The salt prepared in the islands is said to be in great demand in the United States as a preservative, and the present sample was described as 'an exceptionally fine specimen.'

The sample consisted of 1 lb. of salt in colourless crystals,

of the size of the 'fishing salt' used for fish curing. Unlike many salts of commerce, however, there was a complete absence of deliquescence or agglomeration.

The salt has been analysed in the Scientific and Technical Department of the Imperial Institute, and the results obtained are given in the following table, which also includes analyses of representative commercial white salts and sea salts for comparison. An analysis by Goessman and Porter of coarse salt from Turks Islands is also available, and comparison with this shows that the salt produced at the present time is much purer than was formerly the case. None of the recorded analyses of English salts show such a high state of purity as the present sample from the Turks Islands.

ANALYSES OF REPRESENTATIVE SALTS.

	English.		Ameri- can.	Sea Salts.		Turks Islands.	
	Cheshire stoved.	Marshall's.		St. Ubes, Portugal.	Cadiz.	Analysis pre- viously recorded.	Present sample.
Sodium chloride	98.25	98.40	97.31	96.50	92.11	96.76	99.24
Calcium "	0.02	—	0.05	—	—	—	0.22
Magnesium "	0.07	—	0.05	0.32	—	0.14	—
Potassium "	—	—	—	—	—	—	traces
Sodium sulphate	—	0.11	—	—	—	0.64	—
Calcium "	1.55	0.89	1.05	0.88	0.33	1.56	0.02
Magnesium "	—	0.03	—	0.25	0.99	—	0.01
Insoluble matter	—	0.05	—	0.10	0.27	—	0.05
Water	—	0.49	1.94	1.95	6.30	0.90	0.10
Iodine & bromine	—	—	—	—	—	—	traces

No borates or nitrates were present in this sample of Turks Islands salt. Its preservative qualities therefore depend entirely upon the sodium chloride present, and the sample is remarkable only in respect of its exceptional purity.

HONEY FROM DOMINICA.

Mr. A. J. Brooks has forwarded the following report, received from Messrs. Brandon & Co., 32, Fenchurch St., London, E.C., on a case of honey, containing two tins, produced at the Dominica Agricultural School. The report contains information which is likely to be of interest to honey producers in the West Indies:—

The honey was of very dark colour, of strong flavour, and the body of the honey in one tin was thinner than that of the other.

There is generally a free market for this description, the value fluctuating between 14s. and 18s. per cwt., according to the demand which exists at the time and the supply which is offering. To-day, the value is about 18s., this being a very full price.

We may add that this quality honey should not be packed in tins and cases, but in barrels containing about 3 cwt. each. The barrels should be well coopered to prevent leakage, and should be quite clean before the honey is put in them. The honey should be carefully strained before being packed in the barrels.

We have sold the two tins for 18s.

MARKET REPORTS.

London,—May 30, 1906. Messrs. KEARTON, PIPER & Co.; Messrs. E. A. DE PASS & Co.; 'THE WEST INDIA COMMITTEE CIRCULAR'; 'THE LIVERPOOL COTTON ASSOCIATION WEEKLY CIRCULAR,' May 25; and 'THE PUBLIC LEDGER,' May 26, 1906.

ALOE—Barbados, 15/- to 60/-; Curaçoa, 20/- to 65/- per cwt.
ARROWROOT—St. Vincent, 2d. per lb.
BALATA—Sheet, 1/4 to 1/11; block, 1/4 to 1/4½ per lb.
BEES' WAX—£8 15s. to £9 5s. per cwt.
CACAO—Trinidad, 56/- to 63/- per cwt.; Grenada, 51/- to 56/- per cwt.

CARDAMOMS—Mysore, 7½d. to 3/- per lb.
COFFEE—Jamaica, good ordinary, 38/- to 40/- per cwt.
COTTON—West Indian, medium fine, 6·70d.; West Indian Sea Island, medium fine, 13½d.; fine, 14½d.; extra fine, 16d. per lb. Prices paid, 14d. to 15d. per lb.

FRUIT—

BANANAS—Jamaica, 4/- to 6/- per bunch.
GRAPE FRUIT—10/- to 12/- per box.
LIMES—4/- to 4/6 per box.
ORANGES—Jamaica, 3/6 to 6/- per case.
PINE-APPLES—St. Michael, 1/9 to 4/- each.

FUSTIC—£4 to £4 10s. per ton.
GINGER—Jamaica, 58/- to 65/- per cwt.
HONEY—Good to fine pale amber, 24/- to 27/-; dark to clear red, 17/6 to 23/- per cwt.
ISINGLASS—West Indian lump, 1/7 to 2/2; cake, 1/2 to 1/3 per lb.
KOLA NUTS—4d. to 6d. per lb.
LIME JUICE—Raw, 11d. to 1/3 per gallon; concentrated, £20 15s. per cask of 108 gallons; hand-pressed, 2/3 to 2/4 per lb. Distilled Oil, 1/9 to 1/10 per lb.
LOGWOOD—£4 to £4 15s.; roots, £3 10s. to £4 per ton.
MACE—Fairred, 1/4 to 1/5 per lb.
NITRATE OF SODA—Agricultural, £11 15s. per ton.
NUTMEGS—83's, 9d.; 94's, 8½d.; 108's, 7½d.; 113's, 7d. per lb.
PIMENTO—Fair, 2¾d. to 2½d. per lb.
RUM—Jamaica, 2/1; Demerara, 9½d. to 10d. per proof gallon.
SUGAR—Yellow crystals, 14/6 per cwt.; Muscovado, 13/- to 15/- per cwt.; Molasses, 10/6 to 14/6 per cwt.
SULPHATE OF AMMONIA—£12 2s. 6d. per ton.

Montreal,—June 1, 1906.—Mr. J. RUSSELL MURRAY.
(In bond quotations, c. & f.)

COCOA-NUTS—Jamaica, \$26·00; Trinidad, \$24·00 per M.
COFFEE—Jamaica, medium, 10c. to 11c. per lb.
GINGER—Jamaica, unbleached, 16c. per lb.
MOLASCUIT—Demerara, \$1·00 per 100 lb.
MOLASSES—Barbados, 28½c.; Antigua, 23½c. per Imperial gallon.
NUTMEGS—Grenada, 110's, 17c. to 19c. per lb.
PIMENTO—Jamaica, 5½c. per lb.
SUGAR—Grey crystals, 96°, \$1·93¾ per 100 lb.
—Muscovados, 89°, \$1·30 to \$1·40 per 100 lb.
—Molasses, 89°, \$1·25 to \$1·40 per 100 lb.
—Barbados, 89°, \$1·40 to \$1·50 per 100 lb.

New York,—June 1, 1906.—Messrs. GILLESPIE BROS. & Co.

CACAO—Caracas, 12½c. to 13½c.; Grenada, 10¾c. to 11¼c.; Trinidad, 11c. to 11¾c.; Jamaica, 9½c. to 10½c. per lb.
COCOA-NUTS—Jamaica, \$19·00 to \$20·00; Trinidad, \$13·00 per M.
COFFEE—Jamaica ordinary, 8c. to 8¾c.; good ordinary, 8¾c. per lb.
GINGER—Dark scraggy root, 10c. to 11½c.; white to bright bold, 11¾c. to 13½c. per lb.
GOAT SKINS—Barbados, Dominica, and Antigua, 56c. to 57c.; Jamaica, 58c.; St. Kitt's, 50c. per lb.
GRAPE FRUIT—Jamaica, \$5·00 to \$9·00 per barrel; \$3·00 to \$5·00 per box.
MACE—29c. to 34c. per lb.

NUTMEGS—West Indian, 80's, 22½c.; 90's, 20c.; 100's, 19c.; 110's, 14½c. to 15c. per lb.
ORANGES—Jamaica, \$3·75 to \$4·25 per barrel; \$1·75 to \$2·25 per box.
PIMENTO—5¼c. to 5½c. per lb.
SUGAR—Centrifugals, 96°, 3·45c. to 3·48c.; Muscovados, 89°, 2·95c. to 2·98c.; Molasses, 89°, 2·70c. to 2·73c. per lb.

INTER-COLONIAL MARKETS.

Antigua,—May 31, 1906.—Messrs. GEO. W. BENNETT BRYSON & Co., LTD.

SUGAR—\$1·40 per 100 lb.
MOLASSES—18c. per gallon.

Barbados,—June 11, 1906.—Messrs. T. S. GARRAWAY & Co., and Messrs. JAMES A. LYNCH & Co.

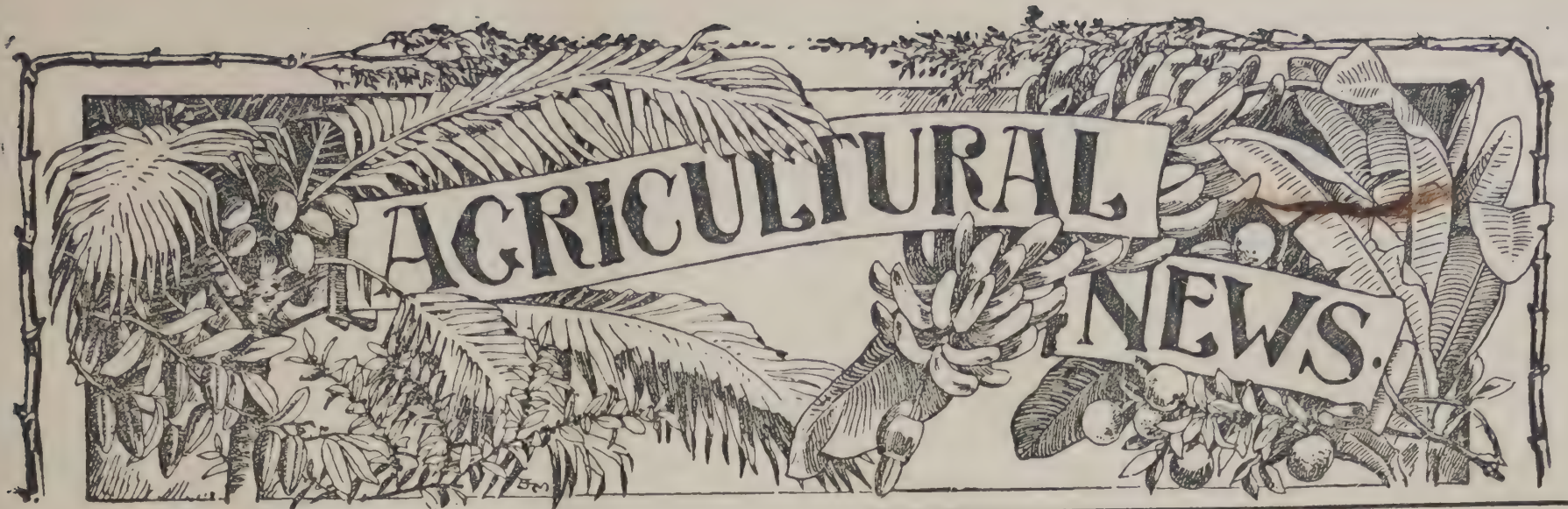
ARROWROOT—St. Vincent, \$4·00 to \$4·25 per 100 lb.
CACAO—\$10·50 to \$11·50 per 100 lb.
COCOA-NUTS—\$11·00 per M. for husked nuts.
COFFEE—\$10·00 to \$11·75 per 100 lb.
HAY—\$1·10 \$1·20 per 100 lb.
MANURES—Nitrate of soda, \$60·00; Ohlendorff's dissolved guano, \$55·00; Cotton manure, \$48·00; Cacao manure, \$45·00; Sulphate of ammonia, \$75·00; Sulphate of potash, \$67·00 per ton.
MOLASSES—Muscovado, 18c. per gallon (puncheon included).
ONIONS—Bermudas, 85c. to \$1·20; Lisbon, \$3·00 to \$4·00 per 100 lb.
POTATOS, ENGLISH—Nova Scotia, \$2·50 to \$3·27 per 160 lb.
RICE—Ballam, \$5·20 to \$5·75 per bag (190 lb.); Patna, \$2·96 to \$3·30; Rangoon, \$2·50 to \$2·80 per 100 lb.
SUGAR—Muscovados, 89°, \$1·40 to \$1·45; Dark crystals, 96°, \$1·80 per 100 lb.

British Guiana,—June 15, 1906.—Messrs. WIETING & RICHTER.

ARROWROOT—St. Vincent, \$8·00 per barrel.
BALATA—Venezuela block, 25c.; Demerara sheet, 38c. per lb.
CACAO—Native, 12c. to 13c. per lb.
CASSAVA STARCH—\$4·00 per barrel.
COCOA-NUTS—\$10·00 to \$12·00 per M.
COFFEE—13c. to 14c. per lb.
DHAI—\$5·40 to \$5·50 per bag of 168 lb.
EDDOES—\$1·44 per barrel.
MOLASSES—15½c. per gallon.
ONIONS—Tenerife, 2¼c.; Bermuda, 2c. to 2½c. per lb.
PLANTAINS—20c. to 40c. per bunch.
POTATOS, ENGLISH—\$2·60 to \$3·00 per barrel.
POTATOS, SWEET—Barbados, \$2·04 per bag.
RICE—Ballam, \$5·50 per 177 lb.; Creole, \$4·50 to \$4·60 per bag (ex store).
SPLIT PEAS—\$6·00 to \$6·25 per bag (210 lb.).
TANNIAS—\$1·20 per barrel.
YAMS—White, \$2·28; Buck, \$3·50 per bag.
SUGAR—Dark crystals, \$1·85 to \$1·90; Yellow, \$2·20 to \$2·25; White, \$3·40 to \$3·50; Molasses, \$1·40 to \$1·80 per 100 lb. (retail).
TIMBER—Greenheart, 32c. to 55c. per cubic foot.
WALLABA SHINGLES—\$3·00, \$3·75, and \$5·25 per M.

Trinidad,—June 16, 1906.—Messrs. GORDON, GRANT & Co.; and Messrs. EDGAR TRIPP & Co., June 2, 1906.

CACAO—Ordinary to good red, \$11·60 to \$12·00; estates, \$12·00 to \$12·50 per fanega (110 lb.); Venezuelan, \$13·00 per fanega.
COCOA-NUTS—\$20·00 per M., f.o.b.
COCOA-NUT OIL—66c. per Imperial gallon (cask included).
COPRA—\$3·50 to \$3·60 per 100 lb.
DHAI—\$4·50 to \$4·70 per 2-bushel bag.
ONIONS—\$3·00 per 100 lb. (retail).
POTATOS, ENGLISH—\$1·50 to \$2·10 per 100 lb.
RICE—Yellow, \$5·00 to \$5·50; White, \$5·75 to \$6·00 per bag.
SPLIT PEAS—\$5·00 to \$6·00 per bag.
SUGAR—Yellow crystals, \$2·00 to \$2·25; Molasses, \$1·50 to \$2·00 per 100 lb.



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a sample of salt from the Turks Islands. Dr. Dunstan testified to the exceptional purity of the sample.

The salt industry in the West Indies is now practically confined to the Turks Islands, where salt is the staple commodity, its extraction finding employment for three-fourths of the population of the dependency. From these islands there is an annual export of some 1,800,000 bushels, of a value of about £22,000. Ten years ago the exports of salt amounted to 2,236,000 bushels, of the value of £33,630, but the industry appears to have suffered very considerably from the import duties imposed by the United States tariff. An increased production of domestic salt in the United States (from 620,000 tons in 1881 to 2,056,600 in 1901) also appears to have affected the industry.

The effect of this factor is referred to by the Commissioner of the Turks and Caicos Islands in his *Annual Report* for 1902 as follows: 'Domestic production and competition have, within the twenty-one years referred to, reduced the importation of salt into the United States by nearly two-thirds, while the annual consumption has increased more than two-fold. Were it not for the excellent preserving properties of the Turks Islands salt—a salt the use of which for pickling purposes was at one time in years past made compulsory by law in at least one of the States of America—the staple industry of these islands would, long ere this, have been in a far more disturbed state than to-day. As long, however, as the quality of the salt is maintained, and as long as the "packer" safeguards his interests by the use of Turks Islands salt, so long will there be a demand for the staple product of these islands.'

Salt Industry in the West Indies.



HE last issue of the *Agricultural News* (p. 207) contained a report, by the Director of the Imperial Institute, on

According to the *Handbook of Jamaica*, there are 231 acres of salt ponds at Grand Turk, 114 acres at Salt Cay, and 248 at Cockburn Harbour. It is estimated roughly that each acre should yield about 4,000 bushels of salt per annum, but this yield is dependent upon fine weather. The salt is produced from sea water by solar evaporation, the water being run into shallow reservoirs and pans on low-lying stretches of the soil, known as 'salinas.' Consequently, the industry depends for its being upon the absence of rain. A very wet year, as for example 1904, is disastrous to the industry. In that year the output was scarcely more than half the average.

The bulk of the salt is shipped as 'coarse' salt to the United States. The price paid for this has for some time been maintained at 6c. per bushel, at which price there is a small profit. Some ten years ago an American aermotor plant was established for crushing the salt. In this way a product is obtained known as 'ground fishery salt,' which brings a higher price (viz., 8c. a bushel) than the 'coarse.' This is mostly shipped to Canada and Newfoundland to be utilized in preserving fish. In lieu of the rent formerly charged for the salinas, the Government now receives a royalty, paid on shipment, at the rate of 10 per cent. on the market value.

It may be of interest to make some reference to the once flourishing salt industry carried on in the Bahamas Islands. This was centred in the island of Inagua. It is considered that, with the aid of outside capital, the industry might be profitably revived.

In a very interesting report attached to the *Annual Report* on the Bahamas for 1901-2, the Resident Justice of Inagua (Mr. P. W. D. Armbrister) states that no doubts whatever could be entertained as to the success of this industry, if it could only be carried on upon a sufficiently extensive scale. 'Inagua's fame as a salt-producing island has not yet died out. The quality of its once staple production is still remembered by salt merchants in the United States and other places. To ensure success to this industry, however, outside capital is most necessary.'

The salt pond at Inagua is about a mile from the shipping place, and the primitive methods of haulage bring the cost on board ship up to 6c. per bushel, leaving a profit of only 1c. per bushel to the pond proprietor. By a proper system of tramway haulage, such as, for example, the endless-cable system used for bringing Trinidad pitch from the Pitch Lake, the salt could be placed on board at a cost of less than $\frac{1}{2}$ c. per bushel.

Mr. Armbrister concludes that, by reason of constant communication with the United States, the demand that exists there for Inagua salt, and also the fact that the Inagua ponds are capable of producing millions of bushels annually, the salt business of the island offers many inducements to a person willing to invest £3,000 or £4,000.

As already stated, this industry was once in a flourishing condition. The salt ponds are of great extent, having been splendidly laid out some thirty to thirty-five years ago, at enormous expense. But in 1900 the output had dwindled to less than 38,000 bushels, valued at only £473. It would appear that the industry never recovered from a catastrophe which overtook it some thirty years ago, when heavy floods washed away the salt and spoiled the pans. There is, however, no danger of the repetition of such a disaster, as a dam has since been constructed by the Government.

It may be of interest to add that salt is also exported, though only in small quantities, from St. Kitt's, Anguilla, and the Virgin Islands. The *Blue Book* returns show that 1,247 barrels (valued at £92) were exported from the presidency of St. Kitt's-Nevis in 1904-5, 342 barrels (of the value of £17) being shipped from the Virgin Islands during the same year.

There is no doubt that there is still a considerable demand for West Indian salt in the United States. Further, it is possible that the trade in this commodity with Canada is capable of extension. In 1902, Canada imported 194,960 cwt. of salt from the British West Indies; in the same year, half this amount was obtained from the United States in addition to large quantities from the United Kingdom and the Mediterranean.

BRITISH GUIANA RICE.

The *Barbados Agricultural Reporter*, of June 29, has the following note on a sample of rice from British Guiana:—

We have received from Messrs. Wieting and Richter, of Demerara, a sample of creole rice produced in the colony of British Guiana and milled under their personal management. Messrs. Wieting and Richter claim that this rice is 'superior in every way to any used in the West Indies; but, being of a later crop than that usually imported from the East Indies, it should not be boiled too long, to prevent it getting sticking and heavy.' This creole rice has a large, bold grain, which presents a slightly brownish appearance, but Messrs. Wieting and Richter say for it that it 'boils perfectly white and grainy, has very little broken grain, is free of meal and dust, and has a sweeter taste than the East Indian Ballam rice.' The sample referred to above is at this office, and, if any dealers would like to call and see it, we should be glad to show it.



SUGAR INDUSTRY.

Naudet Diffusion Process in Cuba.

The *Louisiana Planter* publishes the substance of a report by the delegate of the Agrarian League, who has been investigating the working of the Naudet diffusion process at the San José factory in Cuba. This gentleman is of opinion that the Naudet process is likely to prove beneficial to Cuban sugar planters. He says:—

It is certain that the results heretofore obtained are as yet inferior to those promised by the inventor, but the errors incurred and the contrarieties experienced have been so numerous and so important that it would be unjust to proclaim as a failure a process that, notwithstanding the adverse conditions under which it has been operated, offers so brilliant a prospect to the sugar industry.

I am profoundly convinced of the final success of the Naudet process, and Cuba will owe this benefit to the manager of one of the best-managed central factories in the island, to whose energy it will be due that the said process has not experienced a noisy failure.

The article concludes:—

A few days after the publication of the report of the delegate of the Agrarian League, a Cardenas paper announced that the Naudet process was affording splendid results on the plantation San José, the yield for the past week having been 11·42 per cent. of the weight of the cane, whose saccharine richness does not exceed 13·16 per cent., the loss being thus only 1·74 per cent., and, were the cane to have a saccharine richness of 15·20 per cent., as last year, the yield would reach 12·80 per cent. in pure sugar, equivalent to a commercial yield of 13·30 or 13·40 per cent., of sugar testing 95°.

Varieties of Sugar-cane in British Guiana.

The following is extracted from a report published by the Board of Agriculture on the area under cultivation in British Guiana with varieties of sugar-cane other than the Bourbon, for the year 1906-7:—

Returns have been furnished by every estate in the colony on which varieties of canes are being cultivated.

Varieties of canes other than Bourbon are being grown on areas of more than 1 acre on twenty-six plantations in the county of Demerara, five in the county of Essequibo, and nine in the county of Berbice; or on forty plantations in British Guiana.

Many of the plantations which are growing varieties of canes on a relatively large scale have nurseries of several or of many varieties, the cultivation of which it is intended gradually to extend.

The areas used for the cultivation of the varieties other than Bourbon on the estates participating in the inquiry vary very greatly, from about 1 acre as the minimum to about 4,150 acres as the maximum.

One plantation in Demerara has an area of about 4,150 acres occupied by seedling varieties of canes, while one in Berbice has about 2,380 acres similarly occupied.

The returns show that in British Guiana 21,481 acres are occupied with varieties of sugar-cane other than Bourbon, 14,736 acres being in Demerara, 5,251 in Berbice, and 1,494 in Essequibo.

The total area of 21,481 acres, when compared with 14,743 acres in 1905-6, with 12,860 acres in 1904-5, and with 9,518 in 1903-4, shows an increase upon them at the rates of 45·7, 67·0, and 125·6 per cent., respectively.

The following shows the varieties other than Bourbon which are at present being cultivated on sugar plantations in British Guiana on areas of more than 1 acre in extent:—

Name or number of cane.	Number of plantations.	Number of acres.	Increased acreage on 1905.	Decreased acreage on 1905.
D. 109 ...	34	8,386	2,895	
D. 625 ...	34	3,357	1,912	
B. 208 ...	15	2,125	688	
D. 145 ...	26	1,842	526	
B. 147 ...	21	1,733	404	
White Trans'pt.	23	1,416		308
Sealy ...	11	220		1
D. 78 ...	7	179		98
D. 95 ...	8	170		61
D. 74 ...	7	118		39
B. 109 ...	6	112	30	
Green Trans'pt.	3	98	44	
D. 117 ...	6	88	55	
D. 116 ...	6	79		71
Diamond 185	1	55		
D. 115 ...	10	49		9
D. 4,415 ...	1	40	35	
D. 130 ...	3	30	10	
D. 3,956 ...	4	28	17	
D. 2,468 ...	3	25	14	
Burke ...	1	23		1
D. 1,087 ...	1	10		19

The area returned as being under seedling varieties has increased from 12,942 acres in 1905 to 20,065 acres for 1906, or at the rate of 55 per cent. The area so occupied in 1902 was 4,329 acres; in 1903, 6,321 acres, and in 1904, 9,289 acres. There is, therefore, 363·5 per cent. greater than in 1902, 217·4 per cent. greater than in 1903, and 116 per cent. greater than in 1904.

The successive rates of increase have been:—

For crop of 1903 ...	46·0 per cent.
" " " 1904 ...	46·9 " "
" " " 1905 ...	39·3 " "
" " " 1906 ...	55·0 " "

As the Imperial grant-in-aid for sugar-cane experiments which commenced to be available in this colony in October 1899, ceased to be payable on March 31, 1906, it may be of some interest to record here the extension of the area occupied by seedling varieties of canes since that date. I have not been able to get absolutely reliable figures for the year 1899, but the area then occupied by seedling canes was approximately 550 acres; now it is 20,065 acres, an increase in round figures of 19,500 acres during the existence of the grant. The former area was mainly, if not almost entirely, occupied with seedling varieties raised in British Guiana, while at present over 4,000 acres are occupied by seedling varieties raised in Barbados, and about 16,000 acres with those raised locally. The colony, therefore, has largely benefited from the expenditure on sugar-cane experiments in Barbados as well as from that in British Guiana.



WEST INDIAN FRUIT.

PURCHASE OF BANANAS IN THE CANARIES.

The following reference is made to the banana trade of the Canary Islands in the *Consular Report* for 1905:—

The exports of bananas, tomatos, and potatos continue to increase. In the early months of 1905, owing to the keen competition among exporters, banana farmers in the Canaries obtained prices considerably above the actual market prices in the United Kingdom. In May, however, one of the largest houses doing business in the fruit introduced a new system of receiving and buying.

Contrary to expectations, the West Indian banana seems to have depreciated the larger-sized bunches. It was always thought (and reasonably so) that the smaller Canary bunches would suffer through the importation of the West Indian fruit, and on that expectation growers were constantly advised to exercise the greatest care in cultivation with a view to producing a greater percentage of larger bunches. The unexpected depreciation of the larger bunches has made it necessary to re-organize the whole system of buying bananas in these islands. The method in vogue hitherto was to pay for bunches according to the number of 'hands' they contained. In view of results it would seem that this system has been entirely wrong. Bunches of bananas vary considerably, not only in size, but also in their development; hence two bunches, although containing equal number of hands, need not necessarily represent the same value, as one might be poorly developed and the other well developed and consequently of larger size. The result is that the buyer in the United Kingdom pays more for the better bunch, whereas in these islands they are bought for the same money. The injustice of that system is apparent. Farmers who cultivated with care could not obtain better prices than those who merely watered their land and cut their fruit. It is well known that the Canary banana cannot be shipped to the United Kingdom naked, but that it must be packed very carefully in crates. Therefore the buyer in the United Kingdom will judge by the size of the crate and apparent weight of the fruit. The new system, referred to above as having been introduced, consists simply in paying the farmer according to the quality of his fruit and without reference to the number of 'hands' contained in each bunch. The introduction of this new system met with great opposition, fostered by the competitive firms, and it appeared as if the bold departure would leave the innovators without any fruit. This took place in the month of May, and the outcry against it was that it would leave the farmer in the dark as to the yield of his planta-

tions, which would appear natural enough considering that the system was quite new to him. In addition to the new system, the firm referred to adopted a method of paying for the fruit in accordance with the prices obtained in the British markets, which, of course, entailed constant change of prices here. Previously the price was a fixed one, contracted for a certain number of months or even years. As already referred to above, the West Indian banana has depreciated the prices of the larger-sized bunches, and therefore the buying of fruit had to be modified accordingly. The banana trade now seems to have entered into the phase of an ordinary business, with all its risks, and, contrary to predictions, it does not look as if it would disappear.

LEMON MARKET IN LONDON.

In view of the suggested establishment of a lemon industry in Dominica, the following letter, dated June 8, from Mr. Geo. Monro, of Covent Garden Market, to the Imperial Commissioner of Agriculture, is likely to be of interest:—

I am in receipt of your letter *re* lemons, and beg to say that there are a great many lemons on the market besides the Sicilian and they are always sold very cheap through the cold weather. As your letter states that the lemons would probably be shipped from Dominica during the winter months, we do not think that much could be done with them, but if they could be shipped to arrive here during the summer and autumn months when they are used in much larger quantities, there might be a very profitable trade worked. They generally come in cases containing from 300 to 600, but the package is not so particular if the lemons are good and well graded. We think the ordinary standard orange box of Jamaica and Florida would bring them very well.

We shall be very pleased to handle any that you advise being sent to London, and to report fully on them.

Tonga Beans. In a report on a recent visit to the north-western district of British Guiana, Mr. Edgar Beckett, Agricultural Instructor, suggests that the collection of tonga beans (*Dipteryx odorata*) for export purposes might be profitable. The large tree bearing these beans belongs to one of the few genera of leguminous plants which bear a single seeded fruit. It is a native of Cayenne. Seven other species are known to occur in the forests of Brazil and Guiana. From the beans of *D. odorata* a perfume is obtained.

SHOW OF COLONIAL FRUIT.

The following note appeared in the *West India Committee Circular*, of June 13:—

It was a matter of great disappointment that not a single exhibitor in the West Indies availed himself of the offer of free freight to, and free space at, the show of colonial fruit which was held at the Royal Horticultural Hall, Westminster, on June 6 and 7 last. Due notice of this exhibition was given to all the West Indian Colonies many months ago, and their apathy was naturally the subject of considerable comment, more especially as such far-distant parts of the Empire as Australia and New Zealand occupied a large portion of the hall. Natal also sent an exhibit, and the Transvaal Government made a show of citrus fruits, including oranges, limes, lemons, shaddocks, grape fruit, mandarin oranges, and citrons, which led one to the conclusion that the West Indies will have to look to their laurels and show a greater amount of keenness about such exhibitions, if they are to retain their position in the home markets. It must not, however, be supposed that the West Indies were quite unrepresented. On the contrary, the British West Indian



FIG. 11. SOME WEST INDIAN EXHIBITS.
(From *West India Committee Circular*.)

Fruit Company, the Royal Mail Steam Packet Company, and the West Indian Produce Association, did their best to make good the deficiency, by making representative exhibits. The British West Indian Fruit Company showed principally bananas, which were all in excellent condition and did credit to the carrying powers of the second exhibitor named. Bunches of claret bananas, of course, attracted a large amount of attention. The West Indian Produce Association, Ltd., of 4, Fenchurch Buildings, showed oranges, grape fruit, limes, and their varied West Indian produce now sold under

the trade mark 'Wipa.' A special feature was made of fresh limes and lime marmalade, which was favourably reported upon. The exhibition was very well attended, and, as regards the number of colonies participating, was certainly one of the best of the series which is proving very popular. Cannot a combined effort be made in the West Indian Colonies to send more fruit direct for the next show, which is to be held on December 4 and 5 next? All that intending exhibitors have to do is to select and pack their fruit with the greatest care, and consign it by Royal Mail Steam Packet Company's steamer, *freight free*, to the Secretary, the West India Committee, the Horticultural Hall, Vincent Square, Westminster. We will do the rest!

ORANGES ON ROUGH LEMON STOCKS.

In reference to the note on some curious oranges from British Guiana, which was published in the *Agricultural News* (Vol. V, p. 169), Mr. John Barclay, Secretary of the Jamaica Agricultural Society, has written as follows:—

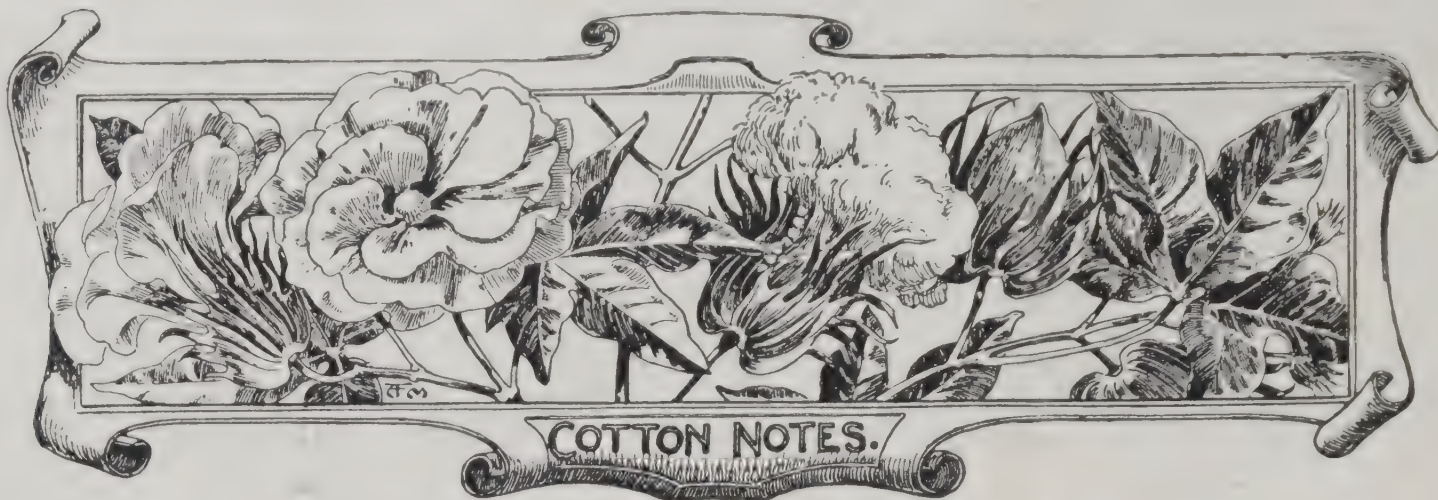
I have noticed in the *Agricultural News* the paragraph on sweet oranges grown on rough lemon stocks where the grower states that the constant result of grafting on the rough lemon stocks is to produce coarse-skinned fruit.

This may be so in British Guiana, but it is not so in Jamaica. In the lowlands of Jamaica, or the middle uplands, the bitter orange is the stock most used, as it is found growing naturally all about, but sometimes the shaddock stock is also used. In the higher elevations, however, the rough lemon has been often used, as there it grows stronger and seems more suitable for the soil and climate. I notice no difference whatever in the fruits from orange trees or grape fruit trees budded on sour oranges and rough lemons growing side by side. The rough lemon is a much quicker grower than the sour orange and seems to thrive better on poor soils. Perhaps, therefore, in British Guiana the coarseness of the fruit may have been produced by the cause you name, 'adverse conditions or by excess of nitrogen in the soil.'

CAMPHOR IN INDIA AND CEYLON.

Steps should be taken by the Forest Department to encourage the cultivation of the camphor tree. Since the Japanese have had Formosa, the price has gone up at least 50 per cent. There is some attempt at cultivating it in Ceylon, and there must be many places in India and Burma where this valuable tree would thrive. This is a cultivation which will no doubt receive the early and serious consideration of the Ceylon Agricultural Board. There are many reasons why the cultivation of camphor should prove attractive to planters. Camphor at present has to be brought a great distance to the western markets, and the supply is very uncertain. Unscientific treatment of the trees has caused a gradual reduction of their numbers, and a deterioration in quality of the produce. It is at present a monopoly of Japan. The uses for camphor are increasing and as the demand increases, the price will rise. A fair start has already been made in Ceylon with the product. (*Indian Engineering*.)

Goats wanted for St. Lucia. The St. Lucia Agricultural Society is desirous of obtaining from Barbados two pairs of goats, preferably the progeny of 'Black Rock' or 'Bruce.' Any persons having such animals for sale should communicate with the Head Office, Imperial Department of Agriculture, Barbados.



EXPORTS OF COTTON FROM THE WEST INDIES.

The following is a statement (furnished by the Customs Department in each case) showing the amount and estimated value of Sea Island cotton exported from the various West India Islands during the quarter ended March 31, 1906:—

Colony.	Bales.	Weight in pounds.	Estimated value.	
			Lint only.	Lint & seed.
Barbados ...	580	253,937	£12,697	£14,501
St. Vincent ...	255½	89,131	4,457	5,089
Antigua ...	257	51,400	2,570	2,935
Montserrat ...		81,250	4,062	4,639
Grenada (Marie Galante) ...	320	95,910	1,795	2,476
Tobago ...	5	1,920	48	61
British Guiana (unknown)...	4	695	22	26
St. Kitt's ...	242	83,993	4,200	4,797
Nevis ...	263	56,530	2,827	3,228
Anguilla ...	359	71,800	3,590	4,099
Jamaica * ...	—	—	—	—
	2,285½	786,566	£36,268	£41,851

* No returns to hand.

The returns for the previous quarter will be found on p. 66 of this volume of the *Agricultural News*.

PLANTING COTTON IN FIELDS PREPARED FOR CANES.

On a number of estates in Barbados cotton is being planted in fields from which cane plants are being taken up on account of their backward state.

In planting cotton in fields that have been prepared for canes, planters are recommended to be very careful about the distances at which the cotton is planted; if the cotton plants are placed too close, it is most probable that a large part of the crop will be lost.

Cotton planted in land which has been well prepared, and to which very heavy dressings of pen manure have been applied, will grow very luxuriantly; plenty of space must therefore be given to the individual plants in order to admit light and air.

The plants should in no case be less than 2 feet apart in the rows, which are themselves 5 or 6 feet apart. In sheltered

positions it may be advisable to have the plants even 3 feet apart in the rows.

When the plantlets are from two to four weeks old they should be thinned out until only the best plant remains in each hole. More than one plant should not be left to the hole.

DISINFECTION OF COTTON SEED.

It has repeatedly been pointed out that, in order to produce cotton of the highest quality, only the best and healthiest seed should be selected for planting purposes.

In the *Agricultural News* (Vol. V, p. 119) planters were strongly recommended to have all their cotton seed carefully disinfected before planting, in order to prevent the germination of any anthracnose spores which remain attached to the seed itself.

Recently specimens of diseased cotton seedlings have been received at the office of the Imperial Department of Agriculture. These had been attacked just above the surface of the ground, the young stems being reduced to a rotten mass, much as if they were 'damping off.' A microscopic examination showed that the diseased tissue was full of hyphae and spores of *Colletotrichum gossypii*, the fungus that causes anthracnose.

On inquiry it was found that no cotton had been planted on the field from which these specimens were taken for practically three years, neither had any cotton been growing just recently in its immediate neighbourhood. These facts would seem to indicate that it was improbable that infection of the seedlings took place either through mycelium in the soil or from spores blown by the wind.

It was learnt that the seed had not been disinfected, and, as it was taken from a field in which anthracnose was observed last season, it is extremely likely that the loss of the seedlings was due to spores attached to the seed at the time of planting. This loss could have been entirely prevented by disinfection of the seed.

Under unfavourable weather conditions a total crop might have been destroyed and, at the least, another field has been infected with the chief fungoid disease of cotton in the West Indies. In this way the spread of the disease has been helped on, for probably no disease would have been found in this field, if only the seed had been disinfected before planting. This disinfection process takes very little time, and it is estimated that 1 gallon of the solution of (1 in 1,000) corrosive sublimate should be sufficient to disinfect 12 lb. of seed at a cost of a trifle over 1c.

All planters of cotton are therefore strongly advised to adopt precautionary methods by having all their cotton seed carefully disinfected before planting, in order to prevent the further spread of fungoid diseases.

WEST INDIAN COTTON.

Messrs. Wolstenholme and Holland, of Liverpool, report as follows, under date of June 12, in regard to West Indian cotton:—

We have had quiet markets for Sea Island descriptions since our last report owing to the Whitsuntide holidays, and very little business has been done. The tendency of prices is in favour of buyers.

The sales include Antigua cotton at 15½d. to 16d. and St. Kitt's at 14d. to 16d.

Spinners are not disposed to buy except at easier prices.

COTTON SEED FOR PLANTING.

It is well known that cotton seed frequently fails to germinate after planting, and consequently a larger quantity of seed is sown than would be required if all the seeds were capable of germination. Often much of the seed that fails to germinate is diseased, and, as the value of the next year's crop depends largely upon whether the best and healthiest seed is selected for planting purposes, a simple method for separating good seed from bad has been sought for.

It would be expected that if a sample of seed were thrown into water the bad seed would float and the good sink to the bottom.

With a view to ascertaining whether such a simple test is reliable, a series of experiments has been conducted in the mycological laboratory of the Imperial Department of Agriculture, of which the following may be mentioned:—

(1) A sample of Barbados cotton seed was thrown into a dish containing clean water. These were stirred and, at the end of three minutes, the floating seeds were picked off and sown for germination tests. The following results were obtained: 'light' seeds gave 90 per cent. germination, 'heavy' seeds, 92 per cent.

(2) The above experiment was repeated and gave the following results: 'light' seeds, 87 per cent.; 'heavy,' 93 per cent.

A long series of experiments of the above kind was carried out and gave results that varied from 1 to 10 per cent. in favour of the heavy seed. Moreover, it was noticed that some seeds floated immediately, while others came up each time they were stirred, and it was thought that the fuzz on the ginned seed seriously affected the results.

In the next series all the fuzz was carefully removed by hand. Of these experiments the following is typical:—

(3) Six hundred cleaned seeds were put into water, 179 swam immediately and gave a germination of 78 per cent.; 304 more swam after half an hour and gave a germination of 93 per cent., while, of the remaining 117, 94 per cent. germinated.

It was noticed throughout that the germination tests were slightly in favour of the 'heavy' seed, and the longer the sample was left in the water and the more the seeds were stirred, the greater the number that floated. It could not be stated that the 'fuzz' influenced these results, as it was all carefully removed by hand.

From the above results it is shown that the difference between good and bad seeds cannot, in Barbados, at least, be obtained by the 'floating' test, and therefore it is advisable carefully to hand-pick all seed before planting to remove those that show signs of disease.

With reference to this testing of cotton seed, it is interesting to note that Mr. H. Maxwell-Lefroy, M.A., in the

Agricultural Journal of India, Vol. I, Part II, p. 174, gives figures which show that, after removal of the lint, the floating test for Indian cotton seed is reliable and affords a ready means of obtaining sound seed for planting purposes. This is contrary to the results obtained with Barbados cotton seed, and may possibly, in some way, be accounted for by the fact that Indian cotton seed is injured by cotton stainers, whereas in Barbados these insects are very rare and cannot be considered as pests.

THE CITRUS INDUSTRY OF SICILY.

The following information on the citrus industry of Sicily is extracted from the *Consular Report* for 1905. A similar review for the previous year appeared in the *Agricultural News*, Vol. IV, p. 228:—

MESSINA.

Oranges and lemons.—The oranges and lemons exported in boxes during the years 1904 and 1905 amounted to 52,085 and 65,359 tons, respectively.

Citrate of lime.—In 1905 the exports of citrate of lime were 3,043 tons, whilst those of 1904 were 3,649 tons.

Lemon juice and essential oils.—The export of lemon juice declined in quantity in 1905. The amount shipped was 1,107 tons, against 2,059 tons in 1904. There was, however, an increase in the export of the essential oils as compared with 1904, when the amount was 391 tons against 413 tons in 1905.

Citrons in brine.—The exports of citrons, halved, in brine, amounted in 1905 to 385 tons, whilst those of 1904 were 2,369 tons. This falling off is due to the almost complete failure of the Calabria crop.

The average price of citrons has been about £1 6s. per cwt., against about £1 during the previous five years.

Bitter oranges.—The crop of bitter oranges has also been short and of very inferior quality. The heavy rains injured the fruit both in appearance and keeping qualities. It is estimated that the crop will be from 35 to 40 per cent. below the average.

CATANIA.

Oranges and lemons.—About 2,000,000 boxes of oranges and lemons were exported to foreign countries during the season 1904-5. Austria-Hungary took about 1,280,000 boxes, Russia about 235,000 boxes, and Germany about 215,000 boxes. The prospects for 1906 are good owing to damage by frost in Spain.

SYRACUSE.

Oranges and lemons in boxes.—The export of oranges and lemons in boxes from Syracuse during the year 1905 amounted to 219,084 boxes, against 226,945 boxes shipped in the preceding year. Twenty-nine thousand, six hundred and sixty-seven boxes were shipped to various ports of the United Kingdom, 175,147 boxes to Austria-Hungary, and 14,163 boxes to Catania for transhipment to foreign countries.

Pickled oranges and lemon peel.—The total number of casks of pickled oranges and lemon peel exported during the year 1905 was 5,750, and all to the United Kingdom; of this amount 2,453 were casks of Seville oranges (halved) in brine.

Lemon juice and essential oils.—The total quantity of concentrated lemon juice shipped during the year 1905 was 490 tons. The amount of oil of lemon and orange produced in the province of Syracuse is difficult to obtain, as it is all sent by railway to Messina. The total quantity is estimated to be about 80,000 lb.

Citrate of lime.—The export of citrate of lime in 1905 was 11 tons.

EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming, should be addressed to the Commissioner, Imperial Department of Agriculture, Barbados.

All applications for copies of the 'Agricultural News' should be addressed to the Agents, and not to the Department.

Local Agents: Messrs. Bowen & Sons, Bridgetown, Barbados. *London Agents:* Messrs. Dulau & Co., 37, Soho Square, W., and The West India Committee, 15, Seething Lane, E.C. A complete list of Agents will be found on page 3 of the cover.

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NOTES AND COMMENTS.

Contents of Present Issue.

In the editorial a brief account is given of the salt industry in the West Indies. Salt extraction is the principal occupation of the inhabitants of the Turks Islands. Formerly a flourishing salt industry existed also in the Bahamas.

On p. 211 returns are published showing the area under cultivation in British Guiana with varieties of sugar-cane other than the Bourbon. There are now 21,481 acres planted in such varieties.

An illustrated article appears on p. 213 dealing with the show of colonial fruit held by the Royal Horticultural Society on June 6 and 7 last.

Among the cotton notes on pp. 214 and 215 will be found a table showing the amount and estimated value of Sea Island cotton exported from the various West India Islands during the first quarter of the year. There are also notes on disinfection and testing of cotton seed before planting.

On p. 218 are published extracts from a paper by Mr. Henry A. Ballou on 'Cotton Stainers.'

A photograph of the Hereford bull obtained by the Imperial Department of Agriculture for St. Vincent in 1902 appears on p. 219.

A paper by Dr. Watts on the 'Influence of marl on heavy clay soils' (p. 221) contains matter of considerable interest to planters.

Germination of Galba Seeds.

In reference to the note in the *Agricultural News*, Vol. V, p. 143, in which it was suggested that galba seed would germinate only in November, Mr. F. R. Shepherd, Agricultural Superintendent at St. Kitt's, writes that his experience does not confirm this. He says: 'I made trials of the germination of galba seeds at the Botanic Station and found that seeds planted in March in boxes have germinated in the same way as other seeds of that kind in from four to six weeks. From my experiments I am sure they will grow at any time under favourable conditions.'

Varieties of Sugar-cane in British Guiana.

It may be of interest to draw attention to the report, published elsewhere in these columns, on the area under cultivation in British Guiana with varieties of sugar-cane other than Bourbon.

The returns show that, for the crop of 1906-7, 21,481 acres are occupied in British Guiana with such varieties, as against an area of 14,743 acres in 1905-6, or an increase of 45.7 per cent. Many of the plantations are now growing seedling varieties on a large scale (one estate in Demerara having an area of about 4,150 acres so occupied), while many of them have nurseries of several or many varieties.

The seedling canes most largely grown are D. 109 (8,386 acres), D. 625 (3,357 acres), B. 208 (2,125 acres), D. 145 (1,842 acres), and B. 147 (1,733 acres).

Atmospheric Nitrogen in Manures.

Several references have been made in previous issues of the *Agricultural News* to the progress that has been made in the development of commercially successful methods of fixing the free nitrogen of the air and thus making it available for agricultural purposes.

The position is reviewed in an interesting editorial in the *Experiment Station Record* for May.

The encouraging results yielded by the Frank and Caro cyanamide process, and further developments in the application of this process, have been followed by the erection of factories in Italy, Germany, and elsewhere to test the process on an extensive commercial scale.

Numerous experiments have shown that the so-called lime nitrogen has a fertilizing value but slightly inferior to that of nitrate of soda and somewhat superior to that of sulphate of ammonia.

It is anticipated that, where cheap water-power is available, this process can be made to yield a product capable of competing successfully in the markets of the world with nitrate of soda.

New methods of fixing atmospheric nitrogen are constantly being devised, and their development, while of great practical importance, is also of the highest significance as an illustration of the successful application of the results of investigations in pure science to practical affairs and commercial needs.

Exports of Trinidad.

The Annual Report of the Collector of Customs on the trade statistics of Trinidad for the year 1905-6, recently issued, shows that the total value of the produce of the colony was £135,373 less than in the previous year.

Sugar, which in 1904-5 showed an increase over the previous year of £286,000, finds itself in the decrease column to the extent of £270,000. The total exports of sugar were valued at £451,986. Asphalt has fallen in value another £30,000.

Cacao, on the other hand, shows the large increase in value of £142,000 over the previous year. The total amount (local produce only) exported was 432,268 cwt., and the value £1,041,109. Cocoa-nuts also show an increase, their value being £29,228, or £7,000 more than in 1904-5. The exports of timber were of the value of £12,951, as against £3,920 in the previous year.

Agriculture in the Canaries.

A note is published elsewhere in these columns on the position of the banana industry of the Canary Islands. The *Consular Report* on trade during 1905 states that 2,578,781 crates (valued at £451,286) were shipped, as compared with 2,048,111 crates (valued at £384,285) in the previous year. The exports of bananas to Germany are increasing considerably, and it is expected that these shipments will go on increasing, as shipping facilities to Hamburg have much improved.

There was a small increase in the output of tomatoes. The crop was much affected by an unfortunate distribution of the rainfall. The exports were of the value of £244,054.

There was a good potato crop, but the heavy shipments to the United Kingdom failed to yield profitable returns.

Prize-holding Scheme at Grenada.

In reference to the scheme for prize holdings among the small cultivators of cacao at Grenada, the objects and provisions of which were set forth in the *Agricultural News* (Vol. IV, p. 375), it may be of interest to mention that thirty-two entries have been handed in, which represent some 75 acres of land situated in different districts.

The Agricultural Instructor has been engaged recently in visiting each competitor, inspecting the holdings, and making notes on their condition, with a view to forming a basis upon which the judges may estimate the amount of improvement brought about during the year.

Considering that the scheme is new to Grenada and that a certain amount of preliminary prejudice had to be overcome, the results, so far, appear to be of a fairly satisfactory nature.

At the same time the Agricultural Instructor is taking the opportunity of trying to put a stop to the disastrous practice of firing the dry leaves in cacao fields, and his advice to fork in and bed the leaves is being adopted.

Rubber Trees in British Guiana.

In a report on a recent visit to the north-western district of British Guiana, Mr. A. W. Bartlett, B.A., B.Sc., Government Botanist, makes interesting observations on the rubber-yielding trees of the colony.

One large grant-holder visited by Mr. Bartlett had a healthy plantation of trees of *Sapium Jenmanii*, transplanted from the forest. Samples were seen of rubber obtained by the Indians from this tree in the forests. It sells in Georgetown for over 3s. per lb.

All the rubber of any value which has been collected in the colony has been obtained from trees belonging to the genus *Sapium*, which appear to be uniformly distributed throughout the forests not far from the coast. Specimens of the rubber have been well reported upon. The Indians wind the rubber off the tree after it has coagulated in strings. As such a crude method is scarcely likely to give satisfactory results, Mr. Bartlett suggests the desirability of obtaining particulars as to methods of tapping the trees and preparing the latex.

The true Para rubber tree (*Hevea brasiliensis*) has not been found in British Guiana, but other species are plentiful. The native species of *Hevea*, however, do not appear to contain sufficient latex to render them of any value.

Agricultural Industries of Montserrat.

In a recent report, published in the *West Indian Bulletin* (Vol. VII, no. 1), the Hon. Francis Watts, C.M.G., D.Sc., discusses the agricultural industries of Montserrat. The island is at present passing through a transitional period. For the past twenty years sugar has been disappearing from the exports, and no other industry has, as yet, taken its place. In 1892 the value of the exports of sugar was £20,559; in 1904 this had dwindled to £3,656.

Next to sugar in importance is the lime industry. It has passed through many vicissitudes—the attacks of scale insects and the destruction of plantations by the hurricane of 1899. Now the export of lime juice and limes has again assumed important dimensions, forming, in fact, the principal item in the island's trade. Their value in 1904 was £7,802.

An interesting industry of recent introduction is the preparation of papain, or the dried 'milk' of the papaw. If a market can be secured, this industry is capable of rapid growth. In 1903 papain was exported to the value of £2,000. Recently the industry has been in abeyance owing, it is stated, to the flooding of the market with large supplies from the East.

Cotton growing has now become an important industry, and upon this, it would seem, the development of the island in the immediate future directly depends. The value of the exports of cotton from Montserrat in 1904-5 was £4,114. About 800 acres were under cotton for the last crop. There are large areas of land suitable for cotton still unutilized.

Dr. Watts suggests that attention should be devoted to the cultivation of cacao and the *Castilloa* rubber tree. A successful sisal hemp industry might also be established.



INSECT NOTES.

Cotton Stainers.

The last issue of the *West Indian Bulletin* (Vol. VII, no. 1) contains a valuable paper by Mr. Henry A. Ballou, B.Sc., Entomologist on the staff of the Imperial Department of Agriculture, on 'Cotton Stainers.' The following extracts are likely to be of interest and give some idea of the scope of the paper:—

The cotton stainers of the genus *Dysdercus* are widely distributed in the cotton-growing districts of the world. Although a great many species have been catalogued and described, very little has been done in recording their habits and life-histories. The notes on habits and life-histories embodied in this paper have been made in the laboratory of the Imperial Department of Agriculture at Barbados on insects in captivity, which have been received from the other islands, or have been reared from eggs produced by such insects.

The present paper contains descriptions of the species known to occur in the Lesser Antilles and Trinidad, a list of the species from tropical and subtropical America, and references to publications in which these species are described or catalogued. Two species and one variety, believed to be new, are described, and notes are added on life-histories, habits, food plants, and on geographical distribution.

In the British colonies of the Lesser Antilles, two species of *Dysdercus* have been recognized: *D. andreae*, Linn., in the Northern Islands, and *D. annuliger*, Uhler, in the Southern Islands. In the French Islands—Martinique and Guadeloupe—*D. delauneyi*, Lethierry, has been recorded.

Specimens of *D. andreae* that have been examined show little variation, either in specimens from the same island or in those from the different islands. Specimens of *D. annuliger* that have been examined show that variations in colour, in addition to those indicated by Uhler in the original description, occur in specimens from the different islands.

Comparisons of the descriptions of *D. annuliger* and *D. delauneyi*, and of these with the specimens, indicated that these names were synonymous. Since the description of *D. delauneyi* was published in 1880, and that of *D. annuliger* in 1894, the name of *D. delauneyi* should stand, and *D. annuliger* be sunk as a synonym of it.

Two species, believed by Mr. Ballou to be new to science, are described as *Dysdercus fernaldi* (found in Grenada) and *D. howardi* (found in Trinidad); also a new variety, *D. howardi*, var. *minor*, which also occurs in Trinidad and was taken on cotton plants with the species. Notes are also given on the life-histories of the different species.

In regard to food plants, Mr. Ballou states, *inter alia*:—

The species of *Dysdercus* are known chiefly as pests on cotton, which seems to be the preferred food. In addition to cotton, the West Indian species feed upon the seeds of the silk-cotton tree (*Eriodendron anfractuosum*), on okra (*Hibiscus esculentus*), on musk (*Hibiscus Abelmoschus*), and probably on

other malvaceous plants; perhaps, also, on plants of other orders, although actual observations are wanting on this point.

Full information is also contained in the paper as to the damage done to cotton, the remedies to be adopted in dealing with cotton stainers, and so forth.

Although cotton stainers have been known as pests for many years, not much has been done in developing insecticides or control measures for dealing with them.

In the West Indies two methods have been used with success. One of these consists in attracting the insects to baits, and killing them with hot water or kerosene. Cotton seed or pieces of sugar-cane, placed in small heaps at frequent intervals throughout the field, have been used for bait. Cotton seed seems to be much preferred to sugar-cane, and, scattered about the gineries, it attracts large numbers of these insects, and may be made to serve as a trap. This method is likely to give best results 'between crops' when there is not much attraction for the insects on the plants.

During the flowering and ripening period, however, the practice of collecting is likely to give the best results. At this time the insects, young and old, are to be found on the cotton plants, and are frequently congregated on the bolls and tips of branches. The method of collecting is this—a bucket or kerosene tin, containing a small amount of water and kerosene, is used for catching the insects, which are shaken or jarred off into it, the film of kerosene killing them quickly.

Mr. Ballou's remarks on the distribution of cotton stainers may be summarized as follows:—

The genus *Dysdercus* presents some peculiar conditions in geographical distribution. *D. andreae* is recorded from the Greater and the Lesser Antilles. It occurs in an unbroken series, with the exception of Porto Rico, from Cuba, its northern and western limit, to Montserrat, its southern and eastern limit. Montserrat and Guadeloupe are shown to have both *D. andreae* and *D. delauneyi*, while from Dominica to the Grenadines only one species, *D. delauneyi*, occurs in each locality. In Grenada *D. fernaldi* and *D. delauneyi* occur, and in Trinidad *D. howardi* and its variety *minor*; while in Tobago only *D. howardi* is known.

Cotton Worm Season.

Reporting on cotton cultivation in Nevis in February last, the Agricultural Instructor mentioned that many planters were resolved to begin their planting much earlier this year, 'so as to have strong mature plants before the "worm season" begins, as the older plants seem better able to withstand an attack than the young plants.'

In reference to this, Mr. Henry A. Ballou, Entomologist to this Department, wrote the following memorandum:—

In regard to the 'worm season' referred to above, I may say that there is a very general popular belief that the worms (cotton worms and other caterpillars) come only at given seasons. The season of abundance with these insects seems to depend on the amount of suitable food and the weather conditions. These conditions are generally found at certain seasons, but the experience of last year with the cotton worm shows that there are no well-defined seasons. Many planters said that there would be no worms after November and December, but in January 1905 they were quite abundant in Barbados, January being 'out of season.'

The matter of planting with reference to a 'worm season' is not, in my opinion, likely to give any practical results.

STOCK NOTES.

Hereford Bull at St. Vincent.

The accompanying illustration (fig. 12) is from a photograph of the Hereford bull which was taken at St. Vincent last September.

This animal was obtained for St. Vincent by the Imperial Department of Agriculture in October 1902. His services have been in constant requisition from the date of his importation. The fine lot of half-bred calves to be seen about the island afford proof of his usefulness. He has always kept in good health and condition. During his stay

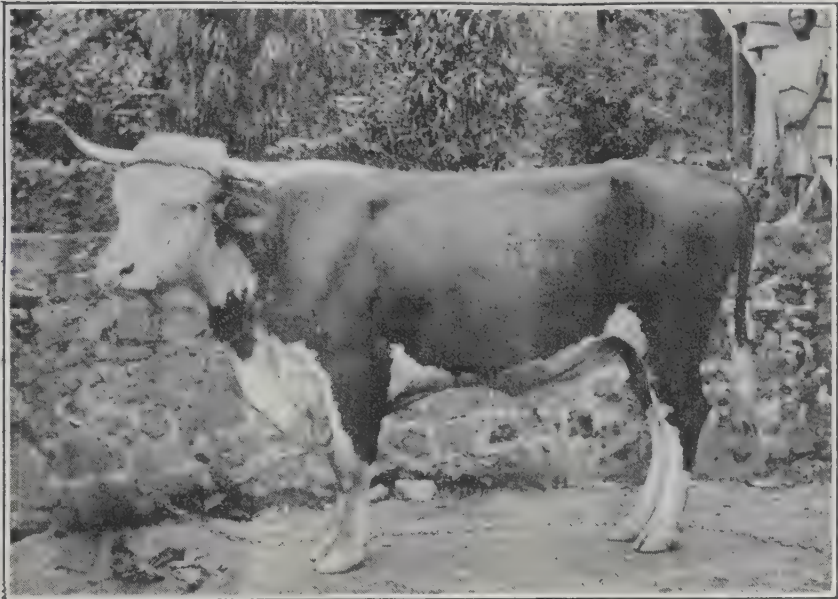


FIG. 12. HEREFORD BULL AT ST. VINCENT.

in St. Vincent the bull was sent to several different estates. When not visiting the country districts, his services were made use of at the Agricultural School, stock being sent in from the surrounding districts.

In March last, in consequence of a desire on the part of stock-owners in Montserrat to improve their stock, this bull was shipped from St. Vincent for Montserrat, where full advantage has already been taken of his services.

Stock at St. Lucia.

In the annual report of the St. Lucia Agricultural Society, read at a meeting of the society held on June 26, it is stated that the animals of the society have been in good health during the year.

The services of the Hereford bull, which has been at Soufrière, have been in steady request.

In May last the society voted \$100 to cover half the cost of the stud fees of an Arab horse to approved mares; the owners paying the other half.

Considerable discussion took place at the meeting with regard to the subject of the improvement of stock. Inquiries are to be made as to the cost of obtaining an Arab stallion for the society, while it was agreed to make arrangements to subsidize a pure-bred Shorthorn bull at present in the island.

There was a consensus of opinion respecting the advantage of improving the breed of goats in the island, as these animals are raised in considerable numbers and meet with ready sale locally. The improvement of the breed of goats in the West Indies having received considerable attention from the Imperial Department of Agriculture, it was resolved that the assistance of Sir Daniel Morris should be solicited.

Improvement of Stock at St. Vincent.

In connexion with the efforts to improve the breeds of stock in St. Vincent, the following notice has appeared in the *Government Gazette*:—

Persons who are willing to import suitable brood mares about 14·2 to 15 hands into St. Vincent, in connexion with the scheme for improvement of the island stock now being undertaken by the Imperial Department of Agriculture, are invited to send in their names to the Agricultural Superintendent at an early date.

It is proposed to award a bonus of £5 for each such animal imported, to be paid three months after arrival, on condition that it then passes an inspection by an officer of the Department and is certified as fully meeting requirements.

The number of animals for which bonuses will be paid is limited to twenty.

CACAO INDUSTRY OF TRINIDAD.

The exports of cacao from Trinidad have, for the last four years, been of the value of over one million pounds sterling. The following table, showing the amount and value of the exports for the last ten years, indicates the rapid extension of the industry:—

EXPORTS OF CACAO.		
Year.	Quantity.	Value.
	cwt.	
1896	209,659	£ 452,141
1897	212,863	532,123
1898	217,330	812,272
1899	260,942	898,389
1900	271,284	978,632
1901-2	268,750	953,287
1902-3	334,821	1,078,498
1903-4	322,804	1,062,417
1904-5	363,983	1,053,886
1905-6	432,268	1,196,450

It will thus be seen that the production of cacao has rapidly increased, having more than doubled itself in the last seven years. Owing, however, to poorer prices, the values of the exports have not increased in proportion during the last two or three years.

Science and Agriculture. Germany is no field for dishonest dealers in cake, mineral manure, seed and meals; they get no chance here at all; science has come to stay among the farmers—among all classes of farmers, great and small; they all recognize the absolute necessity and the pecuniary benefit bestowed upon them by having due knowledge of chemistry and making use of this science to know how to feed their stock judiciously, produce milk, meat, or muscle, how to feed the crops with certain quantities of nitrogen, phosphates, and potash, and to make use of the many Government technical, scientific, and chemical testing institutions established for the welfare of the community and all who choose to use them. (*Consular Report*, ‘Agriculture in the Rhenish Province.’)



GLEANINGS.

During the fortnight ended June 7, 233 bales of West Indian cotton were imported into the United Kingdom. (*West India Committee Circular.*)

Notice is given in the *Dominica Official Gazette* that the price for young lime plants supplied from the Botanic Station will be at the rate of 2s. 6d. per 100.

The *West India Committee Circular*, of June 13, contains an illustration of the Agricultural Show held at Melville Hall, Dominica, on May 2 and 3 last.

According to the annual report of the St. Lucia Agricultural Society, 'the bee-keeping industry has gone ahead greatly during 1905. There are 600 colonies of bees in the island, as against 400 in 1904.'

The Hon. Dr. Watts, C.M.G., suggests that, as the time is approaching when *Castilloa* seed may be expected, Agricultural Officers in the different islands should be prepared to deal with this matter 'as its germination is very poor, if it is allowed to dry even for a very short time.'

Cassia occidentalis, belonging to the natural order *Leguminosae*, yielding what is known as negro coffee, is a native of the East and West Indies. It is naturalized in Mauritius and grown in other hot countries. The roasted seeds are used by the natives as a substitute for coffee and in cases of asthma.

The ordinary varieties of *bougainvilleas* may readily be propagated from cuttings. The handsome brick-red one, unfortunately, presents more difficulties, and cuttings from it rarely succeed. It is said to be capable of propagation by circumposition, a somewhat tedious operation. (*Hawaiian Forester and Agriculturist*, May 1906.)

Board of Trade returns show that the retail prices of 1 lb. of the kind of sugar, whether refined or unrefined, most largely consumed by the working classes in London, Paris, and Berlin, in 1906, are as follows: London, 2d.; Paris, 3d.; and Berlin, 2½d. Customs duties, for the same cities, are 0.45d., 1.44d., and 1.02d. per lb., respectively.

Trial shipments of bananas (Canary Island variety) were made last year by the Board of Agriculture from Bermuda to the United States and England. Four crates were sold at \$1.50 to \$2.00 in New York. The bunches sent to Portsmouth, England, were sold for 7s. each. The latter were reported by Messrs. Pink & Sons to be of 'the right kind for the best class of trade in this country.'

The Royal Mail Steam Packet Company has issued an attractive little pamphlet entitled 'West Indian Fruit and Produce.' It is copiously illustrated, the illustrations showing the principal West Indian fruits, banana plantations, etc.

Dr. Watts mentions that he recently visited a plantation in the Concord Valley, Dominica, where excellent growth had been made by a small plot of *Funtumia* and *Castilloa* rubber trees. The cultivation of the latter is to be steadily extended.

Owing to a good harvest and the greater demand in Marseilles and the continent, the export of ground nuts from Pondicherry rose from 7,026 bags in 1904 to 25,770 bags in 1905; that of ground nut oil from 619 barrels to 1,716 barrels. (*Consular Report.*)

The Government not being able to make a grant for the purpose, the Agricultural and Commercial Society of Antigua has, on the initiative of his Excellency the President, decided to invite subscriptions to a fund to be expended on securing the representation of the island at the Canadian exhibitions in 1906.

In the course of an interview with a representative of the *Port-of-Spain Gazette*, Mr. A. F. Clark, Manager of the West Indian Fruit Company, stated that he expected that an estate in the Erin district would be able shortly to cut and deliver about 1,000 bunches of bananas a week during the season, which is likely to last about six months.

Two reports prepared by the Hon. Francis Watts, C.M.G., D.Sc., have recently been published as Nos. 34 and 35 of the series of Colonial Reports—Miscellaneous. These are 'The Agricultural Industries of Montserrat' (published in the *West Indian Bulletin*, Vol. VII, pp. 1-15) and 'The Sugar Industry in Antigua and St. Kitt's-Nevis, 1881 to 1905,' also published in the *West Indian Bulletin* (Vol. VI, pp. 373-86).

A correspondent writes in the *Tropical Agriculturist* to inquire if the fruits of *Anona palustris* are edible. He is informed that they are not considered so. This tree is a native of tropical America, being quite common in the West Indies, where it is known as the 'Alligator apple' or 'Monkey apple' tree. The only useful property possessed by this tree is that it yields a very light, soft, fibrous wood, which is used for making floats, razor strops, etc.

In regard to the rubber industry of Bolivia (valued at £334,006 in 1904) the British Consul reports: 'The fact that so much attention is being paid to the cultivated plantations in Ceylon, etc., seems to be producing a satisfactory effect in the minds of the owners of plantations here, as I hear that considerably greater care is taken in the tapping of the trees. In former years it was quite a minor question if a tree became useless by over-milking it.'

The *Consular Report* on the trade of Boston for the year 1905 states: 'The importation of bananas from Jamaica and Costa Rica, etc., has increased greatly during the year and keeps a fleet of steamers busy all the year around. The United Fruit Company has two or three steamers arriving every week with full cargos of bananas and tropical fruits, which are disposed of as soon as they are unloaded. Railroad freight cars are brought alongside the steamer and the fruit is transferred direct to them from the vessel and thus they are conveyed to inland towns without delay.'

INFLUENCE OF MARL ON HEAVY CLAY SOILS.

The recently issued Report (Part II) on sugar-cane experiments in the Leeward Islands contains an appendix on the 'Influence of marl (carbonate of lime) on heavy clay soils.' Dr. Watts makes the following interesting observations:—

In last seasons' Report, Part II, p. 11, an account was given of a series of experiments at Bendal's where the usual experiments were laid out in duplicate. In one series, the field had received the ordinary preparation; in the other, an addition of 40 tons per acre of marl, containing 58·8 per cent. of carbonate of lime. In the experiments there recorded it was seen that the use of carbonate of lime increased the yield of cane by 1·7 tons of cane per acre.

The experiments with ratoon canes were carried on on the same plots, no additional marl being employed. The marled area has given an increased yield of 0·9 ton of cane per acre, the increase in the two crops, under very adverse conditions as regards weather, being 2·6 tons of cane, worth some 28s. With more favourable seasons, better results may be looked for.

With the introduction of tramways at Bendal's, the application of marl is taking place on a large scale; a considerable area being treated with some 60 tons per acre. Owing to favourable situation and careful laying of the tramway, the marl can be brought from the quarry to the field by gravity; no power being required for haulage, the empty trucks only requiring to be hauled back. In this way the application is inexpensive, the actual cost being £3 17s. 9d. per acre.

In this connexion, it is interesting to refer to the remarks of Mr. A. D. Hall, Director of the Rothamsted Experimental Station, in his article on 'The Accumulation of Fertility by Land allowed to run wild' (*Journal of Agricultural Science*, Vol. I, Part 2, p. 241), in which he describes the condition of two fields on the Rothamsted Station, namely, Broadbalk and Geescroft. The whole paper is extremely interesting, but space forbids anything but a brief reference. He writes:

'It is difficult to account for the extraordinary differences in the herbage of these two pieces of land; the two fields are not far apart, and, as the mechanical analyses given in the table show, the soils are of very similar physical structure. . . . Despite the identity of the mechanical composition of the two soils, Geescroft field, when under arable cultivation, had always the reputation of being the wettest and most unworkable field on the farm. During the earlier years of the Rothamsted experiments, both oats and beans were grown upon this field, yet it was found impossible to continue the trials, so frequent were the failures to obtain a plant through the intractable nature of the ground in a wet season. Where nitrate of soda was used, the land became specially difficult to manage, remaining persistently wet, and then drying with an excessively hard crust. . . . The vital difference to be found in the soil of the two fields is the presence of chalk in the surface soil of Broadbalk and its absence in the Geescroft soil. The soil of the Rothamsted estate contains naturally no carbonate of lime, but during the eighteenth century most of the arable fields were heavily chalked by the simple process of sinking a pit through the clay to the chalk rock below, which was then drawn out and spread on the land. Thanks to this, the Broadbalk field contains to-day about 3 per cent. of chalk in its surface soil, though little or none is present in the lower layers; the Hoos field contains about 2 per cent., Barn field about the same, while some parts of Agdell field contain as much as 5 per cent. Now, the Geescroft field contains about the same proportion as is to be found in the

natural uncultivated soil from the adjoining Harpenden Common, a little more than $\frac{1}{10}$ per cent. of carbonate of lime, so that evidently it must have escaped the chalking processes, which were already dying out when Sir John Lawes came into possession in 1835. The table shows the amount of calcium carbonate in the first and second 9 inches of the soils in these two fields and of the uncultivated Harpenden Common.

CALCIUM CARBONATE IN ROTHAMSTED SOILS, 1904.
PERCENTAGE IN SOIL DRIED AT 100°.

	Broadbalk.	Geescroft.	Harpenden Common.
1st. depth 0-9 inches	3·325	0·160	0·210
2nd. depth 10-18 "	0·126	0·131	0·136

'It is impossible to resist the conclusion that the unworkability of Geescroft, which practically caused its abandonment as an experimental field and, indeed, as arable land at all, and the extraordinary differences to be seen in the natural herbage it now carries, are due to the lack of chalking received by other Rothamsted fields.'

The facts here brought to light have an obvious application in many parts of Antigua, where there exist, on the one hand, stiff clay soils destitute of carbonate of lime, and on the other hand, hills of soft limestone and marl. The soils of the Bendal's valley consist largely of stiff clays, difficult to work and quickly losing their tilth. It is reasonable to suppose that their condition may be greatly improved by the use of marl, and the Rothamsted experience lends assurance to this view. The work now in progress at Bendal's is therefore of considerable interest and importance, as its success will lead to improvement in the agricultural condition of a relatively large tract of land now difficult to work. In this connexion, it may be remarked that the re-introduction of steam-ploughing indicates that very substantial improvement is being attempted on sound scientific lines, the success of which will be highly beneficial to the island.

Other districts in Antigua offer somewhat similar conditions, so that success at Bendal's will probably be followed by a similar development of energy in other places.

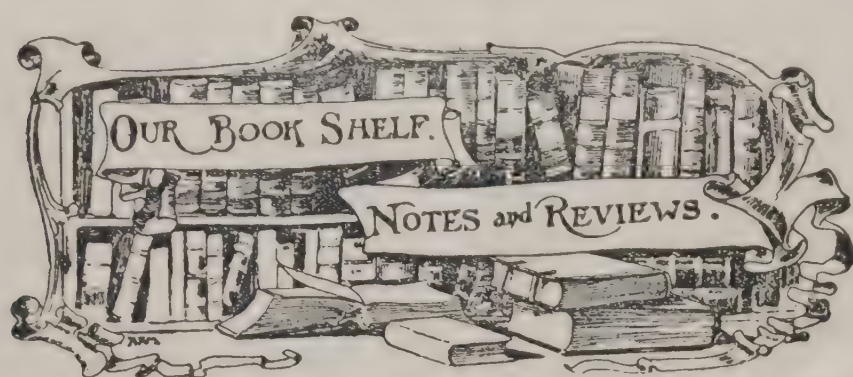
STRAW HAT INDUSTRY AT CURACOA.

The following is extracted from the *Consular Report* on Curaçoa for 1905:—

The straw hat industry has met with ready assistance from the Government and the Society for the Promotion of Agriculture, etc. A fine quality of straw has been imported and skilful hat weavers have been engaged and are paid by the Government to attend classes, which are opened thrice a week, to teach the people to make hats of fine quality. The apprentice pays for the straw used and receives the proceeds of the sale of the hats by the Society for the Promotion of Agriculture. Many fine hats from 2 to 5 florins [3s. 4d. to 8s. 4d.] apiece have already been bought by exporters and shipped to America and European markets. There is every reason to expect that they will secure a market, because the hats are very well made and can compete in price with the Panama hats.

The demand for ordinary Curaçoa straw hats has increased considerably, qualities exported being better than in previous years.

This industry has assumed considerable importance. The exports of hats amounted in 1904 to 46,593 dozen, of the value of £11,648.



THE BOOK OF THE ROTHAMSTED EXPERIMENTS: By A. D. Hall, M.A., Director of the Rothamsted Experimental Station. London: John Murray, Albemarle Street, W., 1905.

In this work Mr. Hall summarizes a mass of information that has accumulated during the time these experiments have been in progress, much of which has already been published in the long series of *Rothamsted Memoirs*.

The purpose of the Rothamsted experiments has been to ascertain how plants grow and obtain nutriment from the soil. No attempt has been made at Rothamsted to demonstrate the most profitable means of growing a particular crop, but rather to arrive at principles of general application, which the farmer must adapt to his special conditions. Mr. Hall's book, therefore, forms a complete guide to the experiments.

Wheat, barley, oats, root-crops, and leguminous crops have been grown at Rothamsted continuously on the same land for many years. The plants were manured, and from the results conclusions were drawn as to the food requirements of the various crops. Five chapters are devoted to these experiments and one to grass land mown for hay every year. As in the other experiments, it soon became evident what manures were needed.

Other chapters deal with miscellaneous subjects of agricultural importance. The book is copiously illustrated by a number of full-page plates and many diagrams.

THE ATLAS OF THE WORLD'S COMMERCE: Edited by J. G. Bartholemew, F.R.S.E. London: George Newnes, Ltd., Southampton Street, Strand, W.C. To be completed in twenty-two parts, issued fortnightly. Price 6d. each part.

The first part of this excellent publication, which is described as 'something new in the way of atlases', appeared on March 15.

The atlas is to consist of 176 large pages of coloured plates, containing upwards of 1,000 maps and diagrams. These are accompanied by descriptive text which practically forms a dictionary of the commerce of the world. 'The first object of this atlas is to show where all the commodities of commerce come from—our food, drink, clothing, and all that we use in our daily lives. It is a key to the merchandise of the world; a summary of its material resources.'

Reference to the parts already issued shows that every endeavour has been made to bring the information contained in this publication up to date. For example, in the articles on cotton mention is made of the efforts of the British Cotton-growing Association to extend the cultivation of this product in British colonies, and of the establishment of the industry in the West Indies.

It is not only in mercantile circles that this atlas will be found useful. There is no doubt that, with the increased attention that is being paid to geography as a school subject, this atlas will be much appreciated; it is certainly likely to prove a valuable acquisition to school libraries.

SHADE TREES.

The *Tropical Agriculturist*, for May, contains the following article on the importance of shade trees in the tropics, with instructions as to planting, etc. :—

Shade trees in the tropics are a boon to man and beast; they afford cool shelter from the fierce sun, beautify our surroundings and render them healthy; they form effectual wind-breaks, and enable us to grow beneath their shade various crops which will not thrive under full exposure to the sun.

Therefore it should be one of the first duties of every person who owns, or is responsible for the upkeep of, roads to plant suitable shade trees along them. Open bleak areas or bare pasture land may be rendered congenial and productive of tender herbage by the planting of shade trees. Remember that trees grow while we sleep, and that in a few years they may practically convert a wilderness into a paradise.

For roadsides generally select kinds with a spreading top and upright clean trunk for at least 15 feet. These are also suited for parks and pasture land, though in this case it is as well to select trees which combine the purpose of ornament with that of shade. Fruit trees in many cases may afford profit as well as shade, but their use in public places has obvious drawbacks.

Some time previous to planting, make holes, 3 feet deep and the same in width, from 15 to 20 feet apart, and, if possible, about 15 feet from the road. Water the plants thoroughly, support them individually with stout sticks if necessary, and shade with cadjan [pigeon peas, *Cajanus indicus*] or other durable leaves.

Protection from cattle is usually indispensable; it may be troublesome and expensive to provide this at first, but it is economy in the end. The ground round the plants should be kept free of weeds, and forked on the surface occasionally. Always look for vacancies on the approach of wet weather, and supply these without delay.

When pruning, be careful to cut the branches with a clean cut surface close to the stem; never leave a stump when cutting a branch, as this will rot and most probably bring disease to the heart of the tree, causing the latter to assume a distorted and stunted shape, if not premature death.

CATTLE POISONED BY JAVA BEANS.

In reference to the note in the *Agricultural News* (Vol. V, p. 351) on the chemical composition of the seeds of the Lima bean (*Phaseolus lunatus*), it may be mentioned that several cases of poisoning among cattle occurred in Scotland last year, which were proved on investigation to be due to the use of meal made from these beans.

According to the *Journal of the Board of Agriculture*, 'it seems probable that the white beans yielded by the carefully cultivated variety of *Phaseolus lunatus* are quite harmless, and so long as trade in this product is confined to this form, there seems to be no risk of danger. . .

'In view of the above conclusions, the Board think that farmers, dairymen, etc., should exercise great caution before using meal made from any but the white form of these beans, while millers, dealers, and middlemen generally should be very careful to see that the beans or bean meal sold by them do not possess any poisonous qualities.'

It is also reported that similar cases of poisoning, which have been traced to the use of Java beans, occurred last year in Holland and Belgium. The matter has been carefully investigated in Scotland by Professor McCall, of Glasgow Veterinary College, and on the Continent by M. Guignard.

WEST INDIAN PRODUCTS.

Drugs and Spices in the London Market.

The following report on the London drug and spice market for the month of May has been received from Mr. J. R. Jackson, A.L.S. :—

Throughout the month of May both the drug and spice auctions were quite of a normal character, with the exception of the interest that is still kept up in the revival of sarsaparilla, and the advance in price of Jamaica ginger and the decline of interest in other sorts.

GINGER.

At the second spice sale, on the 2nd., the offerings of Jamaica amounted to 85 barrels, the new crop finding purchasers at steady rates, the old crop being offered without reserve at a decline of from 2s. to 3s. per cwt. On the 23rd. 65 bags of Jamaica were offered and sold at dearer rates : good medium to fair bright realizing 62s. to 66s., and small dull washed 56s. to 59s. Three hundred and seventy packages of Cochin and Calicut were also offered and 298 sold for the most part without reserve at easier rates, including ordinary small rough lined and slightly wormy Cochin at 26s. 6d. to 27s.; a few cases of bold and medium cut Cochin sold at 65s.; unsorted native cut was bought in at 47s. to 50s.; ordinary small Calicut fetched 27s. to 28s.

MACE, NUTMEGS, AND PIMENTO.

Mace and nutmegs have both maintained a steady sale throughout the month with very slight fluctuations of prices. At the sale on the 9th., West Indian nutmegs were in steady demand at very slightly increased rates. At the final sale on the 30th., 230 packages of West Indian were offered, 205 of which were disposed of at steady rates. Pimento at the first auction was bought in at 2½d. per lb.; a week later there was a much better demand, the prices ruling as follows: Ordinary to fair, 2¼d. to 2¾d.; and a somewhat superior quality at 2½d. Of the 550 bags offered over 500 were sold at the above rates, which were maintained at the close of the month.

SARSAPARILLA.

The month started with a continued demand for this article, 8 bales only of Lima-Jamaica were, however, offered on May 3, the small stocks of grey Jamaica being held at from 2s. 4d. to 2s. 6d. The weekly quotations for the remainder of the month were as follows : On the 10th., 43 bales of Lima-Jamaica were offered and met with a brisk competition, 35 bales of the best quality met with purchasers at from 1s. 5d. to 1s. 10d. per lb.; and for common coarse, at 1s. 5d. to 1s. 7d.; 1 bale of red and yellow native Jamaica fetched 1s. 1d. A week later, grey Jamaica was still firmly held at 2s. 5d. to 2s. 6d., which had dropped on the 24th. to 2s. 3d. and 2s. 4d. for good fibrous, and 2s. 2d. for slightly coarse and sea-damaged. There was also a brisk demand for native Jamaica, 22 bales of which were offered, and all sold at from 1s. 1d. to 1s. 2d. for palish red, partly mixed, and 1s. for sea-damaged. At the close of the month it was reported that the drug in all qualities was exceedingly scarce, though some Lima-Jamaica was still obtainable at from 1s. 10d. to 2s.

TAMARINDS, LIME JUICE, KOLA NUTS, PAPAIN, ETC.

Of other products of the West Indies may be mentioned tamarinds, for which there was a good demand at the spice sale on the 9th.; 30 barrels of good pale bright new-crop

Antigua were disposed of at 14s. 6d., and 6 half-barrels fetched 16s.; 90 barrels of somewhat inferior quality Antigua fetched 13s. 6d. to 14s., and 12 barrels dark syrupy Barbados, 15s. Later on in the month it was reported that small sales had been effected of some new-crop good brown Barbados at 18s. in bond.

At the beginning of the month good raw West Indian lime juice in casks realized 1s. 1d. per gallon, and a week later fair pale raw West Indian was quoted at 1s. 2d. to 1s. 3d. In the middle of the month, 17 bags West Indian kola nuts sold at 3¼d. to 3½d.; and at the close of the month good bright West Indian were held at 4½d. per lb. Powdered papain was also quoted at 12s. per lb.

WEST INDIAN TRADE WITH CANADA.

Referring to a change whereby the sailings of Messrs. Pickford & Black's steamers from St. John and Halifax for the West Indies will take place once in every twelve days instead of fortnightly, the *Maritime Merchant* (Montreal) of June 14 says:—

There is no market that the people of the Maritime Provinces should watch more closely than that in the tropics served by the Pickford & Black line. We ought to be able, in that market, to compete with the rest of the world, and we believe, if Halifax and St. John eventually become manufacturing points of great importance, a very great portion of their products would find a sale through the British West Indies and Demerara. Every step forward by these islands is of importance to us, and while political affiliation may be still a long way off, if it ever come at all, we should certainly be looking after our commercial interests there.

BARBADOS AND THE IMPERIAL DEPARTMENT OF AGRICULTURE.

At a meeting of the Barbados Agricultural Society held on June 29, Mr. C. J. Greenidge, M.C.P., proposed the following resolution, which was seconded by the Hon. Forster M. Alleyne, and carried unanimously:—

The members of the Barbados Agricultural Society hereby desire to place on record their thanks and appreciation to Sir Daniel Morris and the staff of the Imperial Department of Agriculture for their untiring efforts in connexion with the agricultural industries of the island and more particularly so in connexion with the introduction of the Sea Island cotton industry, which has been successfully introduced and now forms a staple industry of the island; and they hope that His Majesty's Government will see their way to continue the grant for the upkeep of the Department for a further period.

It was agreed that a copy of the resolution be forwarded to the Acting Governor, with a request that he would send it on to the Secretary of State for the Colonies.

DEPARTMENT NEWS.

Mr. F. A. Stockdale, B.A., Mycologist on the staff of the Imperial Department of Agriculture, left Barbados on Tuesday, July 10, in R.M.S. 'Orinoco' for Trinidad. Mr. Stockdale will investigate the bud-rot disease of the cocoa-nut palm.

MARKET REPORTS.

London,—June 13, 1906. Messrs. KEARTON, PIPER & Co.; Messrs. E. A. DE PASS & Co.; 'THE WEST INDIA COMMITTEE CIRCULAR'; 'THE LIVERPOOL COTTON ASSOCIATION WEEKLY CIRCULAR,' June 13; and 'THE PUBLIC LEDGER,' June 9, 1906.

ALOE—Barbados, 15/- to 60/-; Curaçoa, 20/- to 65/- per cwt.
ARROWROOT—St. Vincent, 2d. per lb.
BALATA—Sheet, 1/4 to 1/11; block, 1/4 to 1/4½ per lb.
BEES'-WAX—£8 10s. to £9 per cwt.
CACAO—Trinidad, 57/- to 63/- per cwt.; Grenada, 52/- to 57/- per cwt.

CARDAMOMS—Mysore, 7½d. to 3/- per lb.
COFFEE—Jamaica, good ordinary, 38/- to 40/- per cwt.
COTTON—West Indian, medium fine, 6·50d.; West Indian Sea Island, medium fine, 13½d.; fine, 14½d.; extra fine, 16d. per lb. Prices paid, 9d. to 19d. per lb.

FRUIT—
BANANAS—Jamaica, 4/- to 6/- per bunch.
GRAPE FRUIT—8/- to 9/- per case.
LIMES—4/- to 4/6 per box.
ORANGES—Jamaica, 6/- to 7/- per box.
PINE-APPLES—St. Michael, 1/9 to 4/- each.

FUSTIC—£4 to £4 10s. per ton.
GINGER—Jamaica, 58/- to 65/- per cwt.
HONEY—Good to bright amber, 22/- to 24/6; dark to fair liquid, 17/- to 21/6 per cwt.
ISINGLASS—West Indian lump, 1/7 to 2/2; cake, 1/2 to 1/3 per lb.

KOLA NUTS—4d. to 6d. per lb.
LIME JUICE—Raw, 11d. to 1/3 per gallon; concentrated, £20 15s. per cask of 108 gallons; hand-pressed, 2/3 to 2/4 per lb. Distilled Oil, 2/- to 2/1 per lb.

LOGWOOD—£4 to £4 15s.; roots, £3 10s. to £4 per ton.
MACE—Fair red, 1/4 to 1/5 per lb.
NITRATE OF SODA—Agricultural, £11 7s. 6d. per ton.
NUTMEGS—83's, 9d.; 94's, 8½d.; 108's, 7½d.; 113's, 7d. per lb.

PIMENTO—Fair, 2½d. to 2½d. per lb.
RUM—Jamaica, 2/1; Demerara, 9½d. per proof gallon.
SUGAR—Yellow crystals, 14/3 to 16/- per cwt.; Muscovado, 13/- to 14/6 per cwt.; Molasses, 10/6 to 14/6 per cwt.
SULPHATE OF AMMONIA—£12 per ton.

Montreal,—June 1, 1906.—Mr. J. RUSSELL MURRAY.
(In bond quotations, c. & f.)

COCOA-NUTS—Jamaica, \$26·00; Trinidad, \$24·00 per M.
COFFEE—Jamaica, medium, 10c. to 11c. per lb.
GINGER—Jamaica, unbleached, 16c. per lb.
MOLASCUIT—Demerara, \$1·00 per 100 lb.
MOLASSES—Barbados, 28½c.; Antigua, 23½c. per Imperial gallon.
NUTMEGS—Grenada, 110's, 17c. to 19c. per lb.
PIMENTO—Jamaica, 5½c. per lb.
SUGAR—Grey crystals, 96°, \$1·93¾ per 100 lb.
—Muscovados, 89°, \$1·30 to \$1·40 per 100 lb.
—Molasses, 89°, \$1·25 to \$1·40 per 100 lb.
—Barbados, 89°, \$1·40 to \$1·50 per 100 lb.

New York,—June 15, 1906.—Messrs. GILLESPIE BROS. & Co.

CACAO—Caracas, 13c. to 14½c.; Grenada, 10¾c. to 11¼c.; Trinidad, 11¼c. to 12c.; Jamaica, 9½c. to 10¾c. per lb.
COCOA-NUTS—Jamaica, \$19·00; Trinidad, \$13·00 per M. for culls, and \$19·00 per M. for good.
COFFEE—Jamaica ordinary, 8c. to 8¾c.; good ordinary, 8½c. to 10½c. per lb.
GINGER—Dark scraggy root, 10c. to 11½c.; white to bright bold, 11½c. to 13½c. per lb.
GOAT SKINS—Barbados, Dominica, and Antigua, 55c. to 57c.; Jamaica, 57c.; St. Kitt's, 51c. to 52c. per lb.
GRAPE FRUIT—Jamaica, \$5·00 to \$8·00 per barrel; \$3·00 to \$4·00 per box.
MACE—30c. to 34c. per lb.

NUTMEGS—West Indian, 80's, 21c. to 22c.; 90's, 17c. to 18c.; 110's, 14½c.; 130's, 12c. per lb.
ORANGES—Jamaica, \$4·00 to \$4·50 per barrel; \$2·00 to \$2·25 per box.
PIMENTO—4½c. to 5½c. per lb.
SUGAR—Centrifugals, 96°, 3½c. to 3·51½c.; Muscovados, 89°, 3c. to 3·01c.; Molasses, 89°, 2·75c. to 2·76c. per lb., duty paid.

INTER-COLONIAL MARKETS.

Antigua,—May 31, 1906.—Messrs. GEO. W. BENNETT & BRYSON & Co., LTD.

SUGAR—\$1·40 per 100 lb.
MOLASSES—18c. per gallon.

Barbados,—June 25, 1906.—Messrs. T. S. GARRAWAY & Co., and Messrs. JAMES A. LYNCH & Co.

ARROWROOT—St. Vincent, \$4·00 to \$4·25 per 100 lb.
CACAO—\$10·50 to \$11·50 per 100 lb.
COCOA-NUTS—\$11·00 per M. for husked nuts.
COFFEE—\$10·00 to \$11·75 per 100 lb.
HAY—\$1·10 per 100 lb.

MANURES—Nitrate of soda, \$60·00; Ohlendorff's dissolved guano, \$55·00; Cotton manure, \$48·00; Cacao manure, \$45·00; Sulphate of ammonia, \$75·00; Sulphate of potash, \$67·00 per ton.

MOLASSES—Muscovado, 14c. per gallon (puncheon included).
ONIONS—Bermudas, 85c. to \$1·30; Lisbon, \$3·00 to \$4·00 per 100 lb.

POTATOS, ENGLISH—\$2·88 per 160 lb.; Nova Scotia, \$3·00 per 160 lb.

RICE—Ballam, \$5·20 to \$5·75 per bag (190 lb.); Patna, \$3·00 to \$3·40; Rangoon, \$2·75 to \$3·00 per 100 lb.

SUGAR—Muscovados, 89°, \$1·40; Dark crystals, 96°,—No quotations.

British Guiana,—June 30, 1906.—Messrs. WIETING & RICHTER.

ARROWROOT—St. Vincent, \$8·00 per barrel.
BALATA—Venezuela block, 25c.; Demerara sheet, 38c. per lb.
CACAO—Native, 12c. to 13c. per lb.
CASSAVA STARCH—\$3·50 per barrel.
COCOA-NUTS—\$10·00 to \$12·00 per M.
COFFEE—13c. to 14c. per lb.

DHAL—\$5·00 to \$5·20 per bag of 168 lb.
EDDOES—\$1·80 per barrel.

MOLASSES—15c. to 15½c. per gallon.

ONIONS—Tenerife, 2¾c.; Bermuda, 2c. per lb.

PLANTAINS—20c. to 60c. per bunch.

POTATOS, ENGLISH—\$4·00 per barrel.

POTATOS, SWEET—Barbados, \$2·40 per bag.

RICE—Ballam, \$5·50 per 177 lb.; Creole, \$5·00 per bag (ex store).

SPLIT PEAS—\$6·25 to \$6·50 per bag (210 lb.).

TANNIAS—\$1·92 per barrel.

YAMS—White, \$3·00; Buck, \$3·36 per bag.

SUGAR—Dark crystals, \$1·95 to \$2·00; Yellow, \$2·20 to \$2·30; White, \$3·25 to \$3·50; Molasses, \$1·40 to \$1·60 per 100 lb. (retail).

TIMBER—Greenheart, 32c. to 55c. per cubic foot.

WALLABA SHINGLES—\$3·00, \$3·75, and \$5·25 per M.

Trinidad,—June 30, 1906.—Messrs. GORDON, GRANT & Co.

CACAO—Ordinary to good red, \$11·75 to \$12·00; estates, \$12·25 to \$12·50 per fanega (110 lb.); Venezuelan, \$13·00 to \$13·50 per fanega.

COCOA-NUTS—\$20·00 per M., f.o.b.

COCOA-NUT OIL—68c. per Imperial gallon (cask included).

COPRA—\$3·45 to \$3·60 per 100 lb.

DHAL—\$4·40 to \$4·50 per 2-bushel bag.

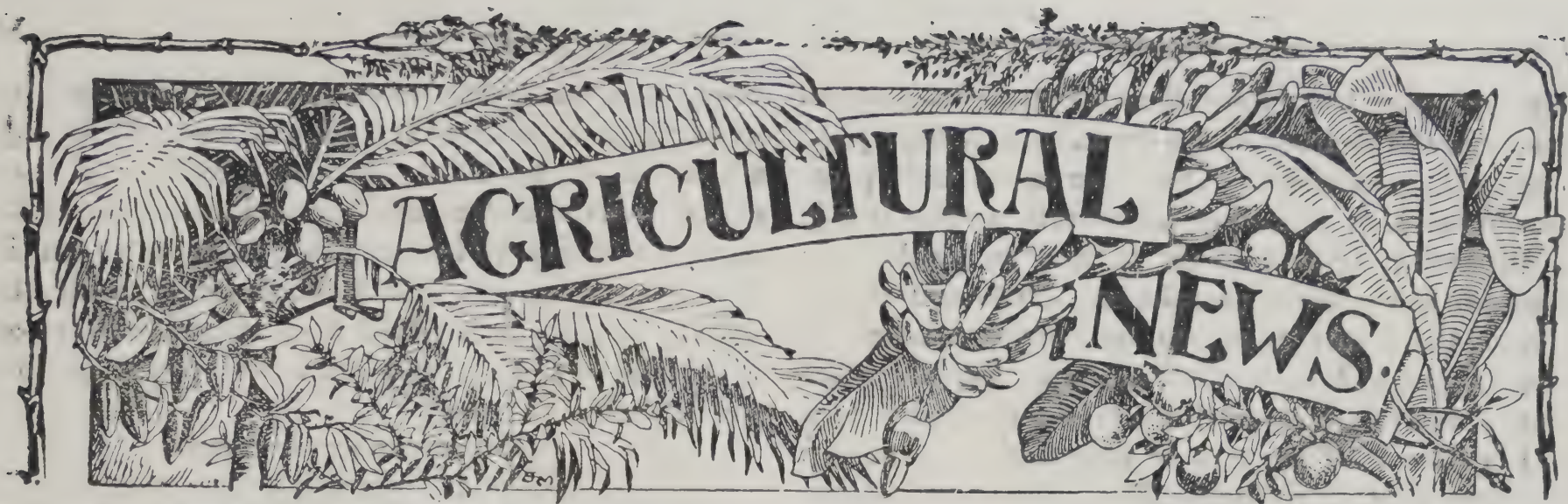
ONIONS—\$1·25 to \$2·00 per 100 lb. (retail).

POTATOS, ENGLISH—\$1·50 to \$2·00 per 100 lb.

RICE—Yellow, \$5·10 to \$5·50; White, \$5·25 to \$6·00 per bag.

SPLIT PEAS—\$5·50 to \$5·70 per bag.

SUGAR—Yellow crystals, \$2·00 to \$2·25; Molasses, \$1·50 to \$2·00 per 100 lb.



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Sugar-cane Experiments in British Guiana.

EXTRACTS have recently been published in the *Agricultural News* from two reports by Professor Harrison on the progress of sugar-cane experiments in British Guiana.

On p. 195 some of the results were given of the experiments carried on in the fields attached to the Botanic Gardens, while the following issue (p. 211) contained returns of the area under cultivation for the year 1906-7 in British Guiana with varieties of canes other than the Bourbon.

The former report covers the period July 1, 1905, to March 31, 1906. During this period some 965 young seedlings were obtained. The season, probably owing to the exceptional dryness of the weather, was not favourable to the production of new varieties. There was a great scarcity of fertile seed, while the cross-fertilization experiments failed completely, no seeds obtained from them germinating.

In the experiments in the North field, D. 625 heads the list of the varieties cut as third ratoons (twelve months old). Its yield was 34·7 tons of canes per acre, with 1·616 lb. of saccharose per gallon of juice. The average yield of these third-ratoon canes was 25·4 tons of canes per acre. B. 147 gave the highest yield among the second-ratoon canes, with 27·8 tons of canes and 1·635 lb. of saccharose per gallon of juice. The average yield was 22·1 tons of canes. In the South field experiments D. 115 gave the best results among the second-ratoon canes; D. 145 among the plant canes. The average yields were 18 and 23 tons of canes per acre, respectively.

Turning to the manurial experiments, it will be observed that there are 'singularly clear proofs of the dependence of the yield of the sugar-cane on the proportion of the available nitrogen added in the manures,' and the experiments, with others previously

reported, show that 'the various varieties of sugar-cane resemble the Bourbon in the dependence of their yield upon this constituent.' The experiments with phosphatic manures, carried on over fourteen years, justify a conclusion which is likely to lead to considerable economy in the use of phosphates. Professor Harrison advises the planter to submit for analysis a sample of the soil to which he contemplates applying slag-phosphates, and so ascertain whether the soil contains more or less than 0.008 per cent. of phosphoric acid soluble in 1 per cent. citric acid. For if a British Guiana sugar-cane soil shows, on analysis, that amount of phosphoric acid, 'manuring with phosphates in all probability will not produce commensurately increased yields of sugar-cane.'

Interest attaches to the table showing the results of growing nine varieties (including the White Transparent) as fifth ratoons. The canes were not 'supplied,' and hence the results are indications of the ratooning powers of the varieties as compared with the White Transparent. All the seedlings gave a higher yield both of canes per acre and of indicated saccharose than the standard variety. Taking the White Transparent as 100, the highest yields of indicated saccharose were as follows: D. 2,468, 192.3; D. 145, 162.0; D. 625, 155.3; D. 109, 151.9; B. 147, 150.0. Professor Harrison is of opinion that some of the new varieties of canes, notably D. 109, D. 145, D. 625, and B. 147, can be confidently recommended to cane farmers for extended cultivation. As a practical result of the experiments, it may be mentioned that 290 mule-cart loads of canes were distributed during the last fortnight of December to the various plantations which applied for them.

The report on the acreage under cultivation of sugar-canes other than the Bourbon has already been reviewed in these columns (p. 216), where it was mentioned that 'for the crop of 1906-7, 21,481 acres are occupied in British Guiana with such varieties, as against an area of 14,743 acres in 1905-6, or an increase of 45.7 per cent.' As stated in the *Demerara Argosy*, 'this means that over 20,000 acres of the once favourite Bourbon have been replaced by seedling varieties, which have proved better adapted for cultivation here, and more capable of withstanding the adverse droughts experienced of late years.' It may be added that the favourite seedlings among the planters are: D. 109, D. 625, B. 208, D. 145, and B. 147.

In concluding both these reports, Professor Harrison testifies to the advantage that has accrued to the

colony from the Imperial grant-in-aid, which commenced to be available in October 1899 and ceased to be payable on March 31, 1906. As shown by the fact that, of the area devoted to seedling varieties, about 4,000 acres are occupied by seedling varieties raised in Barbados and about 16,000 by those raised locally, the colony 'has largely benefited from the expenditure on sugar-cane experiments in Barbados as well as from that in British Guiana.'



SUGAR INDUSTRY.

Hawaii.

The following review of the sugar industry in the Hawaiian Islands during the year 1904-5 is extracted from the *Consular Report* on the territory:—

The total tonnage of the sugar crop for 1904-5 was 426,248 short tons (380,579 tons avoirdupois), which is the largest crop in the history of the islands, with the exception of that for 1903, which exceeded it by 11,743 short tons (10,485 tons avoirdupois).

There are fifty-three sugar plantations in the Hawaiian Islands, situated as follows: Hawaii, twenty-five; Kauai, eleven; Oahu, nine; Maui, eight; all having agencies in Honolulu, on Oahu. Of these plantations all have their own factories except eight, which have their cane ground and manufactured at adjoining factories.

Hawaiian sugar is all exported in the raw state, with the exception of the output of one factory, the Honolulu Plantation Company, which does not turn out any raw sugars. In this factory white sugars in granulated and powdered styles are manufactured and shipped to San Francisco, its output being about 20,000 short tons (17,860 tons avoirdupois) per annum.

The raw sugars are sold under contract to the American Sugar Refinery Company, of New York, the Western Sugar Refining Company, of San Francisco, and the Californian and Hawaiian Sugar Refining Company, of San Francisco. The last-mentioned company is controlled by certain Hawaiian sugar-planting companies owning about 82 per cent. of the whole output of the island.

Raw sugars are sold to the refineries above named on the basis of the prices of Cuban centrifugals in New York. This basis, during the year 1905, rose from 4.90c. duty paid, at which price it stood at the end of the year, to 5¼c. per lb., which price was touched on January 23. Beyond this it did not go. The year's prices, on the whole, were very satisfactory, although there was a serious decline in values during the last three months of the year. By that time, however, almost all the Hawaiian crop was marketed.

It is estimated that the area from which the 1905 crop was taken was about 110,000 acres and that the area now under cultivation, from which the 1906 and 1907 crops are to be harvested, is about double that in extent.

SUGAR-CANE PESTS.

The following is extracted from the report for 1905 of the Governor of this territory to the United States Secretary of the Interior:—

'A few years ago a sugar-cane pest (*Perkinsiella saccharicida*, Kirk.) made its appearance in the sugar-cane fields of Hawaii, introduced, it is supposed, from Australia. It has been stated that this pest caused a monetary loss of upwards of \$3,000,000 to the sugar interests of Hawaii during the past year. It was so destructive to the industry that the Hawaiian Sugar Planters' Association a year ago joined the Territorial Board of Agriculture and Forestry and engaged Professor R. C. L. Perkins, then Acting Superintendent of Entomology for Hawaii, to accompany Professor Koebele on a mission to Australia to search for the natural enemies of the "cane leaf hopper." It did not take their trained eyes long to discover the insects that were holding that pest in check. A few of each were successfully introduced and established here, and now they have been propagated and planted on the various islands and are well established wherever placed. One of the most important is a very minute fly that destroys the eggs of the "leaf hopper" by inserting its ovipositor in the leaf hopper egg and depositing therein an egg, which soon hatches into a small, blind, footless grub, afterwards changing to a pupa and fly, and in the latter stage it cuts its way out and is soon ready to continue the good work.'

Peru as a Sugar-growing Country.

The *Louisiana Planter*, of April 21, 1906, has the following:—

All the conditions of Peru (writes a correspondent of the *Sugar-cane*) are conducive to heavy production, and in some respects it resembles the dry and heavy-producing districts of Hawaii. Where sugar is now grown in Peru, it is grown under irrigation. Grinding can be continued throughout the year; in fact, one estate claims that they have not shut down for extensive repairs for six years. At Carnavjo they have been able to recover an average of about $4\frac{1}{2}$ long tons of sugar per acre; with fully equipped modern machinery this would be somewhat higher. On a piece of land of 85 acres, 79.8 long tons of cane per acre, carrying 14 to 15 per cent. of sugar, have been grown. The canes generally contain a rather high percentage of sugar, 13 to 16 per cent., and high fibre, 12 to 16.5 per cent. The juices are generally of high density, high sugar content, and good purity; as high as 23° Brix has been observed, and sucrose 21°; more often, however, the juice will register 20° Brix and 18° sucrose; in exceptional cases we have noted the sucrose in the juice as low as 15°.

The recent good prices of sugar have encouraged a renewed interest in the sugar industry, and have caused an extra activity in the development of some of the estates.

One of the chief problems for the advancement of the sugar industry in Peru is the development and conservation of the water supply. Artesian wells have been sunk near Lima, and have so far given a good flow.

Peru's output of sugar has been gradually increasing and has risen from 71,735 metric tons, in 1896, to 131,975 in 1904. The total output for 1905 was expected to exceed 143,000 tons.

Sugar-cane Experiments at Barbados. During the crop period 1904-6 there were 7,739 plots under sugar-cane experiments at Barbados, comprising an area of 87.87 acres. There were 172 manurial plots occupying 51.77 acres, while 31.21 acres were devoted to experiments with varieties, which were tried on 709 plots. The remaining area was occupied with chemical selection experiments and trials of first- and second-year seedlings.

DISEASES OF PLANTS.

Valuable work has been carried on in the subtropical laboratory of the Bureau of Plant Industry, U.S. Department of Agriculture, under Professor P. H. Rolfs, in connexion with the introduction of tropical and subtropical plants, and the diseases to which they are liable. In the following extract from the annual report of the Bureau reference is made to investigations of certain diseases of citrus and other trees:—

CITRUS TREES.

Wither-tip.—One of the most serious and wide-spread diseases of citrus fruits, known under the common name of 'wither-tip,' is caused by the fungus *Colletotrichum gloeosporioides*. It attacks the bloom, leaf, small twigs, and fruit, and is especially severe upon the fruits of the lemon and grape fruit. Extensive experiments have been conducted during the present year on orchards varying in size from a few trees to 25 acres in extent. The results of this work show that a vigorous pruning of the diseased twigs, followed immediately by a thorough spraying with Bordeaux mixture, is a practical remedy.

Citrus Blight.—Investigations on the citrus disease known as 'blight' are being continued. As the diseased trees occur sporadically, preventive means are impracticable, and curative methods will have to be developed. The method now employed by the orchardist is that of eradication and destruction. From what is known of the nature of this disease it is quite probable that curative methods will be discovered.

Die-back.—In 1895 the annual loss from die-back was estimated at \$100,000. Vigorous work and careful scientific studies of the cause and cure of this disease have been prosecuted. Now we are able to cure the most stubborn case of die-back at a very small cost, and the annual loss from this disease is exceedingly small.

During 1905 it was not unusual to find more than 50 per cent. of the trees in a region affected; most of which were entirely valueless as fruit-producing individuals. In this indetical region there is now less than one-tenth of 1 per cent. of the green trees affected with die-back. Information regarding the treatment of this disease has been so generally disseminated that no orange grower sustains a loss greater than that portion of his crop which is grown on isolated trees, and orchards containing more than 10 per cent. of trees affected with this disease are now unknown.

CASHEW BLIGHT.

A very serious disease of the cashew has developed within the last few years. By means of artificial inoculation the causative fungus of this disease (*Colletotrichum*) was scientifically established during the year. Meantime, methods of controlling the disease were also devised. Thoroughly cutting out the diseased branches, followed by spraying with Bordeaux mixture, proves entirely efficient and practicable.

MANGO DISEASE.

During the past decade, the mango bloom has been attacked by a disease which caused most of it to shed. This has been proved to be due to a fungus (*Gloeosporium mangiferae*), which also attacks the fruit in all stages of development. A thorough spraying of the panicles during the blooming season proves to be an efficient and practical remedy. This is a very unusual method of procedure, since nearly all other fruits must not be sprayed in the bloom.



WEST INDIAN FRUIT.

COPRA IN SAMOA.

In view of the constantly increasing importance of this product of the cocoa-nut palm, the following extract from the *Consular Report* on Samoa for 1905 may be of interest:—

This article, at present the only Samoan export worth mentioning, might be largely increased. Thousands of acres now lying idle could be turned into cocoa-nut groves, which twelve to fifteen years hence would yield many thousand tons of copra, and as this tree can be planted in with other tropical plants, cacao for instance, there is no reason why more attention should not be paid to it. The copra shipped to Sidney, perhaps half the quantity produced, is principally absorbed by the large soap manufacturers there, but a good deal goes to Europe. The native-made article is entirely sun-dried and fetches a higher price than that cured in driers. On an average, 1,000 cocoa-nuts turn out 450 lb. of well-dried copra. Before drying, each cocoa-nut weighs 1 lb.; the shrinkage in preparing is one-half the original weight. As a rule the shrinkage during the voyage on copra shipped to Sidney is about 4 per cent. and on that sent to Europe say 5 per cent.; after that no shrinkage worth mentioning occurs.

BANANAS IN COSTA RICA.

The following information on the banana industry of Costa Rica is extracted from the *Consular Report* for 1905:—

The exportation of bananas, as in previous years, is increasing rapidly. In 1905, 7,283,000 bunches were exported, an increase of 20.07 per cent. on the total for 1904. The following table shows the export of bananas for the past five years:—

Year.	Quantity.
	Bunches.
1901	3,870,156
1902	4,174,199
1903	5,139,063
1904	6,065,400
1905	7,283,000

The Costa Rica fruit, owing to its fine appearance, flavour, and good carrying qualities, is in great and increasing demand, both in the United States and in the United Kingdom.

The United Fruit Company (of Boston, U.S.A.) have organized their arrangements for cutting, collecting, and shipping the fruit to such a degree that cargos of 50,000 to 60,000 bunches are despatched regularly within forty-eight hours of the cutting of the fruit, and this with the minimum of exposure and damage. One million bunches a month during the busy season (April to July) are now being exported and are handled throughout with admirable care and efficiency.

CANNING PINE-APPLES IN JAMAICA.

Reference is made on p. 233 of this issue to the Norbrook Canning Factory in Jamaica. A representative of the *Daily Telegraph* describes, as follows, the methods by which pine-apples are canned at this factory:—

On a large stand there were about 200 pines of the finest varieties cut and ready to be peeled. From this stand one by one they were taken and attached to a machine where the skin was removed in quick time. Thence the pine passes on to a corer, and it is here that the 'eyes' and other rough parts of the fruit are removed. The meat is now clean and it next goes into a slicing machine, where it is sliced to the shape of a 2-lb. tin. The slices are laid out on a sorter, and they are sorted into two grades. The first grade consists of slices of the fruit which have come out a perfect circle, whilst the second grade is made up of slices not quite so perfect. The first grade of the article is put up in large cans, whilst the second grade is stowed in half-size cans. These cans are taken to a big kettle where syrup is poured on the stuff. This is not all. After the cans have been filled, they are put into a steam box and in rapid succession each tin passes through. Here each tin receives its head; and on the cap machine the cover is laid on; by the manipulation of a spring it is pressed down, and so the tin is sealed. It will thus be seen that the contents of each can are warranted in every respect. What is used throughout the factory is the sanitary can, sealed by special machinery without acid or solder. After the cans have been sealed, they are put into a kettle of boiling water and by this process the stuff inside is boiled. The temperature of the water in the kettle goes up to 270°; but, of course, can be reduced according to requirements. After remaining in the kettle for some little time, the cans are next taken out and put into a tank of cold water for the cooling process. Later on, in the store-room, the tins are polished and labelled. The article is now ready for exportation; but as a rule each tin is kept in the factory for a few days.

SCIENCE NOTES.

The Papaw.

This well-known tree is a native of tropical America but cultivated in most tropical countries. Its botanical name is *Carica Papaya*.

The tree, which is somewhat palm-like in its habit of growth, is small, seldom attaining a height of more than 20 feet, with a slender, fleshy trunk, usually unbranched. It bears a crown of large, deeply lobed leaves. The tree is usually dioecious, that is, the male and female flowers are usually on different trees. The flowers are borne in racemes; the male flowers have a funnel-shaped corolla with ten anthers inserted in its throat, the pistillate flowers are larger, composed of five distinct petals with one pistil.



FIG. 13. PAPAWE.

(From *The Book of Trinidad*.)

The well-known melon-shaped fruit, which grows from the axils of the lower leaves, is used for dessert purposes. The unripe fruit is cooked as a vegetable.

In the West Indies this tree is accredited with wonderful properties. Needless to say, many of these statements are gross exaggerations. They are all, however, connected with the possession of a digestive ferment in the juice. The active principle is known as papain. The commercial preparation of this product was fully described by Dr. Francis Watts in an early issue of the *Agricultural News* (Vol. I, p. 4). Its extraction has of late years formed an industry of some importance in Montserrat, the exports having reached a value of £2,000 in 1903.

A full account of the numerous uses of the papaw tree will be found in the *Agricultural News* (Vol. II, p. 327).

Thrinax Morrisii at Grenada.

Mr. R. D. Anstead, B.A., Agricultural Superintendent at Grenada, has forwarded the following note on this palm:—

I note that from time to time reports have been made upon the specimen of *Thrinax Morrisii* in these gardens, and it may be of interest to you to know that the specimen referred to in these reports is now nearly 6 feet high and in vigorous health. It has lately put out seven handsome flower spikes, and it is hoped to obtain a quantity of seed.

Close to it has been planted out another specimen, which was received from the Botanic Gardens in British Guiana; this is about 2 feet high.

Last year a few seeds were obtained from the former specimen; as these have germinated, there are now some seedlings which will be planted out later.

KOLA NUTS.

In an article on kola, in the *Kew Bulletin* (No. 4—1906), the following account is given of what is known as Labogie kola:—

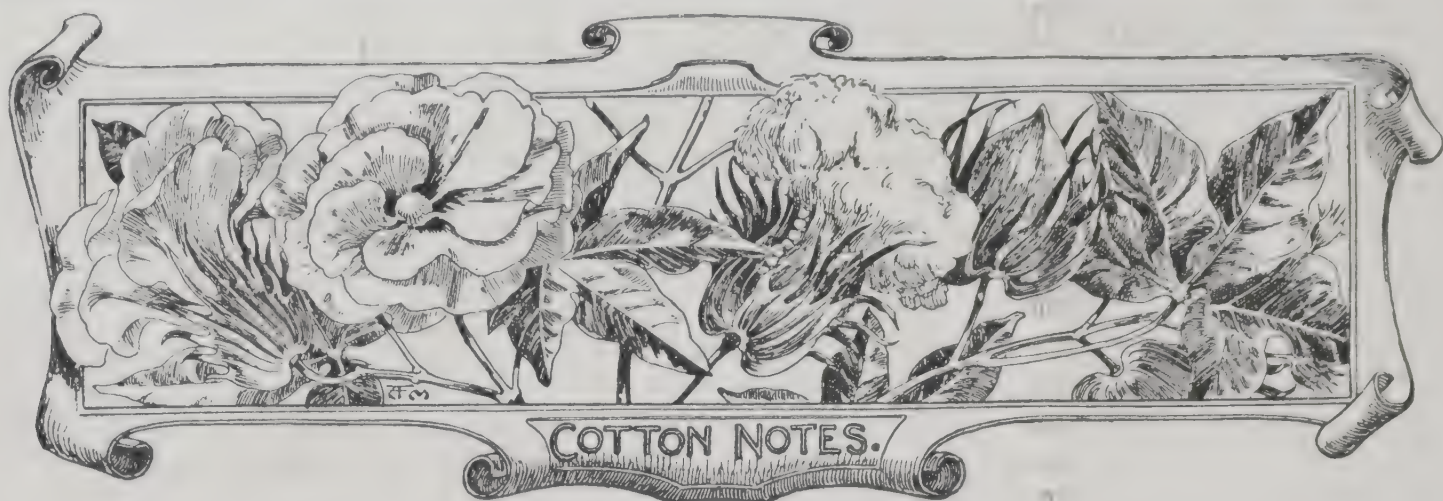
In an article by Count Zech on the kola of West Africa (*Mitth. a. d. Deutsch Schutzgebieten*, XIV, p. 12, 1901) reference is made to the 'Laboshi' kola of West Africa, which is stated by him to be more prized by the kola experts and traders of the Soudan than the Ashanti kola. The Count mentions especially nine localities as providing this superior kola, viz., Laboshi, Fashi, Yakudi, Gbaki, Patchiko, Kimbokun, Bete, Bitagi, and Koda.

In January 1904, specimens reached Kew from Mr. W. R. Elliott, Forestry Officer, Northern Nigeria, of the kola found by him growing in the Labogie district of the province of Nupe in Northern Nigeria. The letter accompanying the botanical specimens states: 'this particular variety of kola nut is in great demand throughout the whole of Northern Africa, and it fetches locally almost double the price of the kind with four or five cotyledons.' The letter continues: 'The kola plantations at Labogie and other places in the district are situated in sheltered valleys at an elevation of from 450 to 550 feet above the sea. The soil is a deep, black, sandy loam, and is kept in a continuous state of moisture by the streams that are found in each valley. Very little care is taken of the trees, and they are found growing with the oil nut palm (*Elaeis guineensis*). The rainfall of the district is probably between 40 and 50 inches, but not a drop of rain falls from December to April.'

On examination, the specimens forwarded by Mr. Elliott were found to belong to the genuine *Cola acuminata*, Schott and Endl. (not of K. Schum.). This species is identical with the kola of Sierra Leone and Ashanti, although the seeds received from Labogie are rather below the average size of the Sierra Leone article.

The source of the 'Laboshi' or Labogie kola was not previously known and its determination was only possible after a thorough revision, by Dr. O. Stapf, of the group of species to which *Cola acuminata* belongs.

It may be mentioned that a paper on the varieties of kola appeared in the *West Indian Bulletin*, Vol. IV, pp. 182-8.



WEST INDIAN SEA ISLAND COTTON.

The following information, relative to sales of West Indian cotton, is extracted from a letter, dated June 26 last, addressed by Messrs. Wolstenholme & Holland, of Liverpool, to the Imperial Commissioner of Agriculture:—

Since our last report the business in West Indian Sea Island cotton has been limited to a few retail sales, which comprise: Montserrat, at 15*d.*; St. Vincent, 8*d.* to 14½*d.*—the former, stained cotton; Barbados, 14*d.* to 15½*d.*; Antigua, 15*d.* to 15½*d.*, and a small lot at 18*d.*; Anguilla, 14½*d.*; and Nevis, 14*d.* to 14½*d.*

There is an inquiry for a limited quantity of extra-fine stapled cotton, which, if here, would sell at 18*d.* to 20*d.*; but apart from this there is practically no demand over 15*d.* Spinners, having large stocks, are disinclined to increase same over 15*d.*

Considering that a large quantity of the American Sea Island was sold this season at 13½*d.* to 14¾*d.*, we think that prices realized for West Indian have been extremely satisfactory.

MANURING OF COTTON.

The kind of manure which is given to any crop is determined by the character of the product desired. When vegetative growth is most important, and where it is desirable that this growth should extend over a long period, pen manure and sheep manure are found to be very useful.

In a crop such as cotton the vegetative growth is only a secondary matter, and it is desirable that this growth should take place as early as possible; in fact, when the plants are about three and a half months old, vegetative growth should cease, and the plants should commence to mature.

A dressing of pen manure, such as is given to canes, will give similar results with cotton, namely, large vegetative growth; this, however, is not desirable.

The manure which has previously been recommended in the *Agricultural News* (Vol. V, p. 116), consists of 300 lb. superphosphate of lime, 40 lb. sulphate of potash, and 100 lb. sulphate of ammonia, or 125 lb. nitrate of soda. The cost is about \$7.00 per acre.

The sulphate of ammonia and nitrate of soda encourage the plant to produce a good vegetative growth; the sulphate of potash is said to increase the quality of the lint, and the superphosphate hastens maturity.

In Egypt it is found that an application of superphosphate of lime is most useful when applied to land which has been heavily manured with pen manure, checking excessive

vegetative growth, and encouraging the formation of flowers.

On land from which first-crop canes have been reaped, a manure such as the above will be found most useful; where ratoon canes have been taken from the field, such a manure ought to be applied without hesitation.

COTTON IN ST. VINCENT.

Mr. W. N. Sands, the Agricultural Superintendent at St. Vincent, has forwarded the following notes on the cotton industry:—

Good planting weather has been experienced since the season opened at the beginning of June, and those planters who used seed of good germination have now got their cultivations established and the plants growing well. Those also who used seed of low germination have, by sowing the seed thickly, and supplying at frequent intervals, obtained, in most cases, a good stand of young plants. Notwithstanding the set-back experienced owing to the unsatisfactory germination of seed from certain estates, planters have energetically met the situation, and the area planted, or in preparation for planting, quite comes up to expectations.

The rainfall has been heavy during the past few weeks. At the Botanic Station 16.88 inches of rain were recorded last month, and rainy weather still continues, so much so that a few days of bright sunshine are badly needed to strengthen the plants and to prevent the early appearance of fungoid diseases.

AGRICULTURE IN DOMINICA.

The *Dominica Guardian* has the following note on agricultural operations in that island:—

The weather continues delightful for planting operations, and from all sides new cultivations may be seen creeping up. Where it is not limes it is cacao that is being put in. Within the past three weeks alone over 20,000 lime plants have left the Botanic Station for different directions; Hampstead alone took 1,000 on Saturday last. The Curator is now preparing some 50,000 plants for delivery between this and August, there being very few on hand for present distribution; but even this large number, it is feared, will be inadequate for this year's demand from the planters. Cacao plants are also leaving the station in large quantities, as well as budded oranges, grafted mangos, and other economic plants. It is also gratifying to observe the state of the bearing cacao trees, which give promise of as fine a cacao crop as has ever been reaped. The crop will be early this year. If weather conditions continue favourable, if we are spared hurricanes, etc., and if prices should not fail, there is every hope of 1906 being a prosperous year to planters and the country in general.

COTTON EXPERIMENTS AT ST. KITT'S.

Mr. F. R. Shepherd, Agricultural Superintendent at St. Kitt's, has forwarded the following account of the experiments that were carried on with cotton at the Experiment Station at La Guerite during 1905-6, together with a report from the British Cotton-growing Association on the 5 bales of lint from the plots, which were shipped to the association:—

These experiments were carried on at La Guerite on 5 acres of land, the property of the local Government, and may be divided into three heads: (1) manurial experiments; (2) experiments in planting at different distances; (3) experiments in planting seed of different kinds.

MANURIAL EXPERIMENTS.

The manurial experiments were a continuation of those reported on last year by the Hon. Dr. F. Watts in the *West Indian Bulletin* (Vol. VI, pp. 247-57), and were conducted on the same plots and on identical lines.

As on the previous occasion, the manures had but little influence on the yield of cotton. These results will be given later in detail; but it is interesting to note the different yields per acre when planted at different dates.

Each plot was almost an acre in extent and planted at intervals of two months, beginning with June and ending in October. The following table gives the particulars:—

Plot.	Date of planting.	Seed-cotton per acre in pounds. 1904-5.	Seed-cotton per acre in pounds. 1905-6.
Series i ...	June	1,341	1,247
Series ii ...	August	1,376	1,183
Series iii...	October	370	152

The yield for both years is given so as to show the result of late planting in each experiment. The seed used in the first year was Rivers', and in the second year St. Vincent.

The picking was all finished by the end of February and the cotton trees pulled up.

The rainfall during the time series i was under experiment was 38·69 inches; series ii, 21·73 inches; and series iii, 13·47 inches.

EXPERIMENTS IN PLANTING AT DIFFERENT DISTANCES.

In this experiment three kinds of seed were used, as follows:—

(1) St. Vincent; (2) Gilbert's seed, obtained from Dr. Watts from Antigua; (3) La Guerite seed, grown at La Guerite the previous year from Rivers' seed.

Each kind of seed was planted over $\frac{1}{4}$ acre, and this was divided into $\frac{1}{8}$ acre and planted at 5 feet by 3 feet and 5 feet by 2 feet. The following table gives the results per plot and per acre:—

Seed planted.	Distance apart in feet.	Seed-cotton per plot in pounds.	Seed-cotton per acre in pounds.
St. Vincent ...	5 × 3	116·0	928·0
" ...	5 × 2	123·7	989·6
Gilbert's ...	5 × 3	122·2	977·6
" ...	5 × 2	99·7	787·6
La Guerite ...	5 × 3	182·3	1,458·4
" ...	5 × 2	148·9	1,191·2

The cotton on these plots was planted early in August, and picking was finished at the end of February.

EXPERIMENTS WITH DIFFERENT VARIETIES.

The experiments consisted of, first, 1 acre of land planted equally in Gilbert's seed and La Guerite seed, $\frac{1}{2}$ acre each, at distances of 4 feet by 2 feet, and, second, of two plots planted in Centreville Sea Island cotton.

The results of the first experiment are given in the following table showing yields of seed-cotton:—

Kind of seed.	Distance apart in feet.	Yield per plot in pounds.	Yield per acre in pounds.
La Guerite...	4 × 2	534	1,068
Gilbert's ...	4 × 2	415	930

This cotton was also planted in August, and picking was finished by the end of February.

The Centreville Sea Island seed received from the U.S. Department of Agriculture through Dr. Francis Watts, was planted on a $\frac{1}{10}$ -acre plot at La Guerite, and on $\frac{1}{3}$ acre at the Botanic Station.

The plot at La Guerite was planted 4 feet by 2 feet; that at the Botanic Station, 5 feet by 2 feet. This cotton was planted in June and gave splendid crop results, as the following table will show:—

Seed.	Area planted.	Seed-cotton per plot in pounds.	Seed-cotton per acre in pounds.	Lint per acre in pounds.
Centreville	$\frac{1}{10}$ acre	192	1,920	560
"	$\frac{1}{3}$ "	408	1,224	360

The seed-cotton from these experiments was ginned at Spooner's ginnery, and the cotton from each kind of seed was ginned and baled separately and shipped to the British Cotton-growing Association.

The following were the ginning results:—

St. Vincent seed, 2,853 lb., extraction 28·2 per cent., 807 lb. lint.

La Guerite seed, 735 lb., extraction 28·8 per cent., 213 lb. lint.

Gilbert's seed, 592 lb., extraction 26·3 per cent., 156 lb. lint.

Centreville seed, 600 lb., extraction 29·3 per cent., 176 lb. lint.

Total, 1,352 lb. lint.

Report from British Cotton-growing Association.

The following report has been received from the British Cotton-growing Association:—

'Two bales St. Vincent seed—"clean and bright, staple fine, moderate length, value, 16d. per lb."

'One bale La Guerite seed—"clean and bright, staple fine, moderate length, value, 16½d. per lb."

'One bale Gilbert's seed—"clean and bright, very fine long staple, value, 17d. per lb.; since sold at 18d. per lb."

'One bale Centreville seed—"clean and bright, but wanting in fineness, value, 15d. to 15½d. per lb., since sold at 15½d."

EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming, should be addressed to the Commissioner, Imperial Department of Agriculture, Barbados.

All applications for copies of the 'Agricultural News' should be addressed to the Agents, and not to the Department.

Local Agents: Messrs. Bowen & Sons, Bridgetown, Barbados. *London Agents:* Messrs. Dulau & Co., 37, Soho Square, W., and The West India Committee, 15, Seething Lane, E.C. A complete list of Agents will be found on page 3 of the cover.

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Agricultural News

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NOTES AND COMMENTS.

Contents of Present Issue.

Recent reports on sugar-cane experiments in British Guiana are reviewed in the editorial in this issue. Important results are recorded in regard to the manuring of the sugar-cane and the selection of new seedling varieties for cultivation in British Guiana. Reference is also made to the increasing popularity of some of these new varieties.

An interesting note appears on p. 228 describing the canning of pine-apples as carried on in the recently established canning factory in Jamaica. Reference is also made to this factory on p. 233, which, as far as is known, is the only venture of the kind in the West Indies.

On p. 229 will be found an illustrated note on the papaw.

A report on the results of cotton experiments carried on at the La Guerite Experiment Station, St. Kitt's, is published on p. 231. Mr. Shepherd reports on manurial experiments, experiments in planting at different distances, and experiments with different varieties.

Notes on a new scale insect on date palms in Egypt and on the butterflies of British Guiana will be found under the head of 'Insect Notes' (p. 234).

In view of the efforts that are being made to extend the cultivation of the Central American rubber tree, Mr. Moore's notes on rubber growing in St. Lucia are likely to be of service. (See pp. 238-9.)

West Indian Botanic Stations.

Several of the Annual Reports of the Botanic Stations and Agricultural Schools in the West Indies, for the year ended March 31 last, are now in the press and will be issued shortly. One of these—that for Montserrat—has just been issued and is reviewed on p. 237 of this issue.

As in previous years, these reports will contain, in addition to a record of the usual routine work of the gardens and schools, notes on the experimental cultivation of economic plants and on the progress in the establishment of new industries. In this connexion the reports on the progress of the cotton industry in several of the islands will be likely to afford useful information.

Peppers from Nevis.

Reference was made in the *Agricultural News* (Vol. IV, p. 280) to the results of a trial shipment of peppers grown at the Nevis Experiment Station.

A further shipment (of 1 barrel) was made in May last with the result that the peppers sold 'at the exceptionally high price of 80s. per cwt.'

Messrs. Lewis & Peat, of Mincing Lane, London, to whom the shipment was made, have reported as follows:—

'We have the pleasure to enclose contract for a little lot of capsicums shipped from St. Kitt's, which we have sold at the exceptionally high price of 80s. per cwt. We could not, of course, rely on anything near this figure for any quantity. The average value would be not more than about 40s. per cwt. If the quality can be kept up to the small trial shipment, we think this value might be relied upon. Of course it must be borne in mind that there is only a very limited demand for this description of chillies.'

Canadian Exhibitions, 1906.

In consequence of changes having been made in the dates of sailings of the Pickford & Black steamers, it becomes necessary to revise the dates, given on p. 175 of this volume of the *Agricultural News*, for the forwarding of exhibits for the Canadian exhibitions to be held in August and September next.

The S.S. 'Orinoco,' there stated to be due to leave Demerara on July 28, will leave on July 31, touching at the various islands as follows: Trinidad, August 3; Barbados, August 6; St. Lucia, August 7; Dominica, August 8; Antigua, August 9; St. Kitt's, August 11; and arriving at St. John on August 20.

For the Halifax exhibition it is suggested that a convenient opportunity would be offered by the S.S. 'Angola,' due to leave Demerara on August 24, touching at the various islands as follows: Trinidad, August 27; Barbados, August 30; St. Lucia, August 31; Dominica, September 1; Antigua, September 2; St. Kitt's, September 4; and arriving at St. John on September 13.

Agricultural Industries of Costa Rica.

The principal industry of Costa Rica is coffee cultivation. The value of the exports during 1905, according to the *Consular Report*, was £775,135. It would appear that the banana industry, which, as shown on p. 228, has made great strides of recent years, is likely in the near future to take premier place. The value of the exports of this fruit has now reached £748,510.

A trade in other fruits has been started, oranges and pine-apples having been shipped during the year. £19,343 worth of rubber—from uncultivated trees—was exported. There was also an increase in the production of cacao. In addition to supplying the considerable home demand, the plantations exported 2,930 cwt., of the value of £12,244.

Jippi-Jappa Hat Industry in Jamaica.

Several references have been made in the *Agricultural News* (see Vol. IV, p. 313) to this promising industry. In Jamaica, hats, which are excellent substitutes for the well-known 'Panama hats,' are made from the straw of *Carludovica jamaicensis*.

Unfortunately, the supply of these hats is very far behind the demand. There seems to be no doubt that a large trade could be done if more attention were devoted to the industry. It would appear that the principal drawback is the ignorance on the part of the peasantry of the art of curing the plant and preparing it for the manufacture of hats.

Good results may, therefore, confidently be expected from a practical demonstration of the curing of jippi-jappa straw that is, according to the *Jamaica Daily Telegraph*, to be a feature of the agricultural show shortly to be held at Lucea. The demonstration will be given by an expert from Messrs. J. E. Kerr & Co.'s factory at Montego Bay.

Rubber Growing in St. Lucia.

Useful information is published on pp. 238-9 with regard to rubber growing in St. Lucia. The Central American rubber tree (*Castilloa elastica*) has been successfully grown in that island, and marketable rubber of good quality obtained from the tree.

Mr. Moore gives full directions as to the soil, climate, shade, etc., required by this tree; also as to the raising of seedlings and the planting out of the young trees.

In some cases Castilloas are being planted as shade trees for cacao. Separate plantations are also being established. In the latter case, the trees should stand, finally, at not less than 20 feet apart each way. It has not yet been decided whether it is better to plant the trees at this distance at the outset, or whether to place them at half that distance and thin them out when about nine years old, after they have been tapped twice. It is probable that the former plan will prove preferable, using the intervening space for the cultivation of annual catch crops.

Agricultural Industries of Bermuda.

In the report of the Board of Agriculture in Bermuda for the year 1905, reviewed elsewhere in this issue, the Superintendent of the Public Garden states that onions comprise about three-fifths of the total output of produce from the colony; during 1905, 400,138 boxes were shipped, valued at £62,454. The industry suffered considerably from the attacks of a fungoid disease (*Peronospora Schleideni*). Thrips were also partly responsible for a reduction in the crop.

Potatoes continue to yield a small profit to the growers. During the year 28,590 barrels were shipped, yielding £21,214. Several new varieties have been received from the Department of Agriculture of Canada for trial at the garden.

The lily industry has suffered considerably from the planting of mixed stock.

Attention is being paid at the garden to the possibilities of the cultivation of strawberries, oranges, avocado pears, bananas, and other fruits. The orange trees in Bermuda have been almost entirely destroyed by scale insects. It is suggested that it may be possible to grow a variety which may prove more or less immune to the attacks of this pest; the 'Navel' is being tried for this purpose.

Avocado pears do not fruit regularly in Bermuda. The cause of this is being investigated.

Fruit-canning Factory in Jamaica.

On p. 200 of this volume of the *Agricultural News* a brief note was published in reference to the establishment of a fruit-canning factory in Jamaica. A recent issue of the *Jamaica Daily Telegraph* (June 28) contains a description of the operations at this factory, which has been established by the Norbrook Canning Company.

The prime mover in this new enterprise is Mr. G. Loutrel Lucas, who has been engaged in pine-apple growing—in Florida and Jamaica—for twenty-three years. For some time his efforts as a grower and exporter of pine-apples in Jamaica met with success, but the irregularity in the sailings of the vessels, which then existed, and other difficulties caused him to turn his attention to converting the fruit into preserves.

The factory is reported to be a building 150 feet long by 46 feet in width. An account of the methods adopted in canning pine-apples is published elsewhere in this issue. While pine-apples are receiving primary attention at this factory, mangos, guavas, limes, and many other tropical fruits are also being preserved in one way or another. Mr. Lucas has established a pinery on the land adjoining the factory, where 166,000 pine-apples are now growing.

The development of this enterprise, which, as far as is known, is the first venture of the kind in the West Indies, will be watched with much interest.

The subject of canning pine-apples was dealt with in an editorial in a recent issue of the *Agricultural News* (p. 177). A paper on the same subject, with more detailed information, will appear in the *West Indian Bulletin*, Vol. VII, no. 2 (now in the press).



INSECT NOTES.

The Date Palm Scale.

A new and very interesting species, the first African representative of the genus *Sphaerococcus*, has been discovered by Mr. Walter Draper, F.L.S., who for the last ten years has been in charge of the Government Gardens, Delta Barrage, near Cairo. This new species of scale insect, which is extremely common on date palms in Egypt, occurs in the form of white patches on the base of the leaf-stalks immediately below the head of the palm. It has received the name *Sphaerococcus Draperi*, Newstead.

Mr. Robert Newstead, the expert on Coccidae at the Liverpool University, to whom specimens were sent for identification, states that 'the female of the new species is distinguished chiefly by the minute rudimentary antennae, the entire absence of legs, and the character of the wax-like covering. The larva is also characterized by the antenna which has the first segment unusually broad. There are also other minute differences.'

The diagnostic characters of the genus are: Adult females, naked or producing cotton or wax; anal tubercles absent; anal orifice without hairs; antennae usually of less than seven joints, but sometimes atrophied; legs present, atrophied or deformed.

Eighteen species are recorded from Australia, nearly all of which inhabit galls on various species of Eucalyptus, etc.; two are described from the United States of America, one from Japan, and the newly-discovered one in Egypt, which has been dedicated to the discoverer, makes a total of twenty-one species.

We understand that Mr. Draper, who has had some considerable experience with scale and other insect pests in Egypt, is about to publish a small work on Egyptian coccids.

Butterflies of British Guiana.

Mr. James Rodway, F.L.S., contributes to the *Demerara Argosy* (June 30) an interesting article on the larger butterflies of British Guiana; he deals with those found in the neighbourhood of Georgetown and treats them from the standpoint of enemies of cultivated plants.

The first butterflies mentioned by Mr. Rodway are the yellow *Callidryas* (*Catopsilia*) *eubule* and the white *Pontia monuste*, which are the most common. Reference to the paper 'Notes on West Indian Insects' in the *West Indian Bulletin* (Vol. VII, no. 1) will show that these are also common in Barbados, St. Vincent, Grenada, and other islands. In British Guiana the former lives on yellow-flowered species of *Cassia*, with which the pale, greenish-yellow colour of the larvae and pupae harmonizes. The insect is never, however, such a pest as to destroy the tree. The white butterfly, which belongs to the same family as the cabbage butterfly of England, feeds on a plant (*Cleome*

speciosa) of the family *Capperideae*, which is very closely allied to the order *Cruciferae*, to which the cabbage belongs. The larva of this butterfly is green with dark lines and dots, and the pupa white with touches of black. 'Its food plant (*Cleome speciosa*) is not uncommon in gardens, where it is cultivated for its mauve flowers. The plant is often eaten to the root, but as it seeds freely, this destruction is only a temporary check.' Another common species, known as the passion flower butterfly, *Agraulis* (*Dione*) *vanillae*, is also found in several of the West India Islands. It is of a brick-red colour with dark markings; the larva is dark coloured with numerous black spines. 'It feeds on the simatou, water lemon, and other plants of the passion flower family, eating leaves and young stems often down to the root. Immediately on discovering that the larvae are at work, they should be picked off and destroyed with the single eggs from under the leaves, as well as the pupae found in the neighbourhood on posts and sticks.'

Anosia plexippus, very common in British Guiana, and found also in the West India Islands, is known as the wild ipecacuanha butterfly, its food plant being the common weed *Asclepias curassavica*. 'It is a very handsome insect, the ground colour of a rich buff, broadly bordered with dark brown variegated with white dots and spots; the veins of the same dark colour, much broader in the female; the under surface paler with silvery markings.'

The lovely *Papilio polydamus* is to be found wherever the 'Dutchman's pipe' (*Aristolochia triloba*) or other species of the same genus is growing. Mr. Rodway says: 'If I want to get flowers, I have to destroy the eggs, larvae, and pupae in great numbers.'

'The last to be mentioned is the palm butterfly (*Brassolis sophorae*), a pest to our cocoa-nut and cabbage palms. I am afraid that I cannot say a word in its favour, for it is not even beautiful. Like some other wrong-doers, it hides from sight in the day, coming out at dusk to lay its eggs on the palm leaves. Its colour is a dark brown banded with dull orange on the upper surface, and a paler brown with white dots underneath. The larva is also dull coloured, reddish with pale yellow lines. Soon after coming from the egg, they form hiding places by bringing together the edges of the palm leaves, from whence they issue at night to feed upon the whole crown. If all the leaves are eaten, or if they attack the centre of the crown, there is no hope of recovery, but if they can be picked off before they get too far, little harm is done. It follows, therefore, that immediately the grower sees his cocoa-nuts attacked, that is, when even a single leaf has been eaten, he should send up and cut off every leaf where there is the least sign of folding or bare midribs; special attention should also be paid to the eggs, which are conspicuous enough as they are pinkish, and laid in clusters of about a hundred.'

DEPARTMENT NEWS.

The degree of Master of Science (M.Sc.) has recently been conferred by the Massachusetts Agricultural College upon Mr. Henry A. Ballou, B.Sc., Entomologist on the staff of the Imperial Department of Agriculture for the West Indies.

Mr. Ballou is expected to return to the West Indies about the middle of August, resuming the duties of his office at St. Kitt's. He will spend some time in the Leeward Islands inspecting the Botanic Stations and investigating the insect pests of sugar-cane, cotton, limes, rubber, etc.

STOCK NOTES.

Pony Stallion at Dominica.

The pony stallion 'Norman' was obtained from Jamaica in 1900 and sent to the Virgin Islands. After remaining there for nearly two years, he was sent to Dominica, his services being available at the Agricultural School. During his stay in Dominica full advantage was taken of his services, seventy-four mares being served by him.

At the Agricultural show in 1904 a special prize was offered for the best foal sired by one of the Department's stallions ('Jamaica Lad' or 'Norman') and was won by one of 'Norman's' foals, the property of the Hon. S. R. Pemberton.



FIG. 14. PONY STALLION 'NORMAN.'

'Norman's' presence in Dominica, where he has been very popular, has undoubtedly had good effect on the horses of the island. His progeny promise well and are highly thought of by their owners.

Since March last the pony stallion has been at Nevis. The accompanying illustration (fig. 14) is from a photograph taken at Dominica early last year.

Ayrshire Bull for St. Vincent.

A young Ayrshire bull has been obtained by the Imperial Department of Agriculture, through the Acting Secretary for Agriculture, Nova Scotia, for the stud farm at St. Vincent. The bull arrived at Barbados from Canada on July 5. He will be kept in Barbados for a few weeks and inoculated with anthrax vaccine before being sent on to St. Vincent.

This animal obtained second prizes at the agricultural shows throughout the province last year. He is twenty-two months old.

The following information with regard to his pedigree, etc., has been furnished:—

'Duke of Truro 2nd.'—By Howie's 'Morning Star,' imp., first at Halifax, and a full brother to the sweepstakes bull at Toronto last year. His dam is 'Myrnie of Belleville,' a very fine heifer, whose dam, 'Myrnie,' was sweepstakes cow at Halifax for six years. 'Myrnie of Belleville's' sire was 'Hanover 1st,' of Maple Grove, imp., 1st. prize at Halifax.

Belgian Hares.

Mr. C. W. Meaden, Manager of the Government Farm, Trinidad, has forwarded the following note on a disease affecting the livers of Belgian hares:—

Belgian hares as an article of food are well worth their care and keep. Generally, they give little trouble and are perfectly healthy. But recently a couple here have been discovered with diseased livers. The accompanying letter from Dr. J. R. Dickson, M.B., D.P.H., describes the parasite and the ailment which, though not particularly dangerous, should be watched for. The affected hare does not show any symptoms which would lead to the sickness being discovered, and the two cases were found only when the animals were killed for cooking.

Cleanliness and exercise would no doubt tend to diminish any susceptibility to this disease, but damp locations have an influence towards it.

Dr. Dickson writes as follows:—

'The specimen (liver of Belgian hare) contained numerous abscesses due to a parasite—the *Coccidium oviforme*. This parasite is a *Gregarina*, belonging to the group *Sporozoa*, and very frequently occurs in the liver of rabbits. Usually it is not of pathological importance, as it confines itself to the liver, but occasionally it gets to the intestines and sets up acute diarrhoea; epidemic diarrhoea, apparently due to it, has occurred in sheep and cows.

The flesh of animals whose livers are affected with the parasite is usually considered quite good, the liver being, of course, discarded.'

CASTOR OIL SEED TRADE.

In April last his Honour Mr. Douglas Young, then Commissioner of the Turks Islands, forwarded to the Imperial Commissioner of Agriculture some castor oil seeds, with a request that their market value might be ascertained.

The castor oil plant (*Ricinus communis*) is very common throughout the West Indies, and it is possible that a trade in this product might be worked up in several of the islands. The following letter, dated June 19, has been received from Messrs. Lewis & Peat, of Mincing Lane, London, to whom the sample was forwarded:—

We are obliged by your favour of the 25th. ultimo, enclosing copy of a letter from Mr. Douglas Young respecting castor oil seed, and we have the pleasure to inform you that there is a very large business done in this article. The present value of the sample you sent us would be about £11 10s. per ton ex ship, c.i.f. delivered weights, with allowances for damages, less 2½ per cent. discount—London or Continental ports.

Quantity, say, 100- to 500-ton lots. The value fluctuates considerably, recently touching £12 10s. and two years ago, £6 10s. per ton.

We hope to hear that it will soon be possible to ship large quantities.



GLEANINGS.

Dr. G. C. Henderson, of Kingston, Jamaica, has made 'a very generous gift of a large collection of orchids' to the Botanical Gardens at Hope. (*Jamaica Gazette*.)

From Antigua 40 bales of cotton (29 bales of first quality and 11 bales of stained or second quality) were shipped by the S.S. 'Parima' for transhipment to the R.M. steamer at Barbados.

The 1905 sugar crop of Madeira was larger than that of 1904, and a larger proportion of the cane was utilized in the manufacture of sugar. Little or no sign of disease was observed. (*Consular Report*.)

During the quarter ended March 31 last, 42,000 lb. of cotton, of the value of £1,500, were exported from Jamaica. The amount exported during the corresponding period of 1905 was 3,918 lb., of the value of £154.

All the unoccupied land among the limes in the 2-acre plot at the Tortola Experiment Station has, after being well forked and hoed, been planted in cotton. It is thought likely that the limes will benefit by the cultivation of the ground in this manner.

The output of canned pine-apples from Hawaii has risen from about 8,000 cases in 1903 (one case contained twenty-four cans averaging 2 lb. each) to some 20,000 cases in 1904. For 1906 the estimate is 12,000 cases (holding each one dozen glass containers) equal to about 135 tons. (*Consular Report*.)

According to the *Consular Report* on the Friendly Islands, the quantity of copra exported from the protectorate during 1905 exceeded that of the previous year by 1,860 tons, and this in spite of the great falling off in the Vavau district (from 2,687 to 1,433 tons) owing to the disastrous hurricane in the beginning of the year.

The Agricultural Instructor at Nevis reports that a new form of gin is on trial in that island. 'It is said to clean and gin the cotton at one and the same time. As far as the writer can judge from the several experimental settings of this machine, it has great promise.' Further particulars of this gin will be awaited with interest.

Writing to the Director of Public Gardens in Jamaica on the use of the powder bellows for applying Paris green, described in the *Agricultural News* (Vol. V, p. 154), Mr. W. B. Seabrook states: 'It is the simplest to operate of any contrivance yet devised; is more efficacious in its deadly work on the worms, and the most convenient to handle.'

The Agricultural Instructor reports that there are indications that considerably more land will be planted in cotton in the Virgin Islands this year than last. The best Sea Island cotton seed has been distributed to some 140 applicants. This should result in an improvement in the quality of the crop, and more rapid progress is likely to ensue in consequence.

In reference to the note in the *Agricultural News* (Vol. V, p. 201) on tannin materials in Jamaica, the *Bulletin of the Department of Agriculture* (June) gives the exports of divi-divi and barks of all kinds from Jamaica. In the year 1904-5, 148,190 lb. of divi-divi were exported. The exports of bark of all kinds during the same year amounted to 263,974 lb. and 810 bags.

According to the *Consular Report* on Porto Rico for 1905, there are at least 7,000 acres under systematic citrus cultivation, more or less advanced towards the remunerative stage. About 70 per cent. of this acreage is in oranges, 25 per cent. in grape fruit, and the remainder in lemons. 'In addition to climatic advantages, market conditions would appear to single out Porto Rico as an ideal orange-growing spot.'

It is observed from a recent report of the Agricultural Instructor at Nevis that most of the young cotton has made satisfactory growth. In some fields the leaf-blister mite has made its appearance. This is being treated with sulphur and lime. It is unfortunate that a large amount of 'old cotton,' infested with this pest, has been left in the fields throughout the island. Energetic action on the part of the planters in the matter of clearing away 'old cotton' is desired.

According to the *Washington Star*, the U. S. Department of Agriculture is keenly alive to the necessity of keeping the mongoose out of that country. The Department has a number of inspectors at every port whose duty is to prevent the entrance of this animal, which is sometimes brought by travellers as a pet. While it is admitted that the mongoose is useful in destroying snakes, it also exterminates ground-nesting birds, lizards, etc., which assist in keeping noxious insects in check.

In reference to the note in the *Agricultural News* (Vol. V, p. 197) upon the baobab tree (*Adansonia digitata*), Mr. R. D. Anstead writes from Grenada: 'There are two handsome specimens of this tree growing not far from the Botanic Gardens here, on the Tantine Swamp. In 1896 they were enclosed within railings by the Government for protection. The larger of the two has a double trunk with a base girth of 32 feet, and a girth, 4 feet from the ground, of 24 feet. During the past twelve months both trees have been almost continuously in flower, though no seed appears to have set.'

In letters from England it was frequently assumed that in the event of a fire, where canes were insured, practically no loss was incurred. The loss of the cane tops in the field and the cane-top heaps stored up deprived the stock of valuable food, and the loss of trash prevented the planter from sheltering young canes from the heat, and ultimately rain came and rotted them and diminished the humus of the soil. It was calculated that after a bad fire an estate often did not recover the loss for four or five years. (*West India Committee Circular*.)



BERMUDA: REPORT OF THE BOARD OF AGRICULTURE, 1905.

Considerable space is devoted in this report to efforts that were made by the board to establish a trade for the sale of Bermuda agricultural products in markets other than those of the United States. Onions were shipped to Canada and to the United Kingdom, but the results were so unsatisfactory that no further trial was recommended.

A sample of unginned Sea Island cotton, grown in Bermuda, was sent to the Imperial Institute for a report upon its quality and commercial value. The sample was considered to be of excellent quality and was valued at 13*d.* to 14*d.* per lb. A report on the general subject of cotton growing in Bermuda, by Mr. T. J. Harris, the Superintendent of the Public Garden, is attached. Taking into consideration all the conditions as to available land and the price of labour, Mr. Harris is of opinion that the cultivation of cotton in Bermuda would not be attended with sufficient profit to attract the interest of the farmers.

In his report on the Public Garden, Mr. Harris makes interesting observations on the agricultural industries of the islands. He is of opinion that excellent wrapper tobacco can be successfully grown and cured in Bermuda.

An effort is being made to select varieties of strawberries best adapted to Bermuda. Twelve thousand rough lemon and Seville orange stocks have been raised from seed obtained from Jamaica. These will be budded and prepared for distribution. Efforts are also being made to build up a trade in the Canary Island banana.

MONTSERRAT: ANNUAL REPORTS ON THE BOTANIC STATION AND EXPERIMENT PLOTS, 1905-6.

Mr. Robson's report states that the total expenditure on the Botanic Station at Grove and the Experiment Stations at Olveston and Harris' amounted to £641 13*s.* 9*d.* The sum of £39 19*s.* 3*d.* was received from the sale of plants and produce.

During the year 6,774 economic plants were distributed, in addition to a large number of cuttings of cassava and sweet potatoes.

The results of the various experiments with economic plants at the stations are stated in detail. Particular interest attaches to the experiments with onions and broom corn, in view of the fact that a small onion industry has been successfully established, and that there are signs of the cultivation of broom corn being taken up to supply the Canadian market.

The progress reported last year in the establishment of the cotton industry has been maintained. During the year 132,848 lb. of cotton were shipped, as against 70,758 lb. in the year 1904-5. The prices ranged from 1*s.* 2*d.* to 1*s.* 4½*d.* per lb. The value of the exports was £6,064; in the previous year, £3,384. It is estimated that there will be a larger area devoted to cotton growing this year.

It is evident that useful work has been done by Mr. Robson and Mr. Dudley Johnson in assisting to develop this industry, as also several other minor industries.

The rainfall returns show that the year was not as dry as the previous one. At the Grove Station 59.51 inches were recorded, 59.45 inches at Olveston, and 50.47 inches at Harris' Station.

Further efforts were made to improve the local breeds of stock in Montserrat during the year. The stallion 'Jamaica Lad' was received from Dominica, the Hereford bull from St. Vincent, and the Devon bull 'War King' from Antigua.

All these animals have been made use of, and their presence in the island is much appreciated. A Berkshire boar and a pair of young Anglo-Nubian goats were also added to the live stock.

DOMINICA AGRICULTURAL SCHOOL.

The following is the general report of the examiner (Mr. F. A. Stockdale, B.A.) on the recent half-yearly examination of the pupils of the Dominica Agricultural School:—

Of the eighteen pupils who sat for this examination only one is new, and comparison with the papers that were sent up in the last examination shows that continued progress is being made.

Three boys took the papers set for the senior class, and the work throughout was very satisfactory. A. T. Pinard has given place in this examination to Cuffy, who has come out top with 78 per cent. of the total marks.

The papers in Agriculture throughout the senior class were the weakest, but improvement has been shown since the last examination. The questions directly dealing with the experimental work in the grounds attached to the school were all answered well, and clearly showed that the boys take a considerable interest in this work.

A considerable improvement has been made in Chemistry, which was the weakest subject in the last examination; but it would be advisable to give continued attention to this subject so that the improvement recently made may be maintained.

Of the fifteen boys who took the papers for the junior class, two obtained over 70 per cent. of the total marks, and only one, excepting the new boy, obtained less than 50 per cent. The work, on the whole, is very uniform and of a very satisfactory nature. Garraway and Lamothe sent in very good papers, and seeing that these boys occupied high positions in the last examination, they might be promoted to the senior class. Prosper came next, having advanced from thirteenth place to third; but it would be advisable for him to continue for another half-year at least before going on with senior work. Lawrence has also improved considerably and comes tenth on the list.

The Arithmetic is again the best of the more important subjects, most of the boys obtaining nearly full marks. The Botany and Chemistry papers were also good. Continued attention should be given to the Chemistry, and a few observation lessons in this subject might be useful.

The Agriculture was the weakest, and the boys should be trained to apply what they are taught in school to the work they do in the field.

It is very satisfactory to note that the tendency to learn off notes of lessons by heart is diminishing. This, possibly, may be due to the observation lessons that have been given to the boys, and it would be desirable that these be continued, as they teach the boys to think and reason for themselves.

RUBBER GROWING IN ST. LUCIA.

The following has been prepared by Mr. J. C. Moore, Agricultural Superintendent, St. Lucia, and issued as a leaflet for distribution in that island. Mr. Moore deals fully with the subject of rubber growing in St. Lucia:—

The demand for rubber in connexion with various manufactures appears to be growing so rapidly that the establishment of rubber plantations in the countries adapted to its cultivation is receiving much attention from planters and capitalists.

The few plantations, established about twelve to fifteen years ago in different parts of the world, are now reaping the benefit of the present high prices for rubber; and as the result of having the trees in plantation form, instead of scattered about in forests, as in the natural state, the owners are able to collect and prepare the rubber at a minimum cost, and also to place on the market a superior article.

The attention of planters is invited to the possibilities of rubber growing in St. Lucia, where there is an abundance of land suited to its cultivation, and there appears to be every prospect of such an industry proving remunerative.

The successful cultivation of Central American rubber trees under plantation conditions and the production from them of a very good quality of marketable rubber have been experimentally demonstrated in the island.

THE TREE TO PLANT.

Of the many rubber-producing plants, the three most important sources of commercial rubber are:—

Para rubber (*Hevea brasiliensis*), Central American rubber (*Castilloa elastica*), and West African rubber (*Funtumia elastica*).

The *Castilloa elastica* was introduced into St. Lucia about eighteen years ago. It has been successfully cultivated on a few estates during the last twelve years, and is the kind now recommended to the notice of planters for extended cultivation, either in separate plantations, or as a permanent shade tree in cacao fields, for which it has proved itself suitable.

SOIL AND CLIMATE.

The *Castilloa* requires a warm, humid climate, a good annual rainfall, averaging not less than about 70 inches, and a deep, rich soil; in fact, the land most suitable for growing cacao may be regarded as suitable for this rubber tree.

It is not desirable to plant above an altitude of 1,500 feet, and in selecting situations preference should be given to alluvial soils in valleys, or rich, deep soils on the slopes of the lower ridges.

Although plenty of water and a humid atmosphere are required by this tree, the greatest care should be taken to secure good drainage, either natural or artificial, at the roots, as anything approaching a swampy condition is most detrimental to the growth of the tree.

SHELTER.

A plantation should not be open to the full force of strong wind, and if natural protection in the form of forest belts or ridges cannot be secured, it would be necessary to regard the planting of suitable wind-breaks as one of the first operations in establishing a plantation.

SHADE.

While the tree benefits by shelter from very strong winds, it does not appear to suffer from occasional winds of

moderate force, and on this account is very suitable for planting amongst cacao as a sun-shade, and to deflect winds, which, after being lifted above the cacao field by a good shelter-belt, are liable to strike the cacao trees at some distance from the belt unless kept above by trees such as the Immortel and rubber. Although shade is not required for the *Castilloa* as a tree, it is necessary while the plant is young, and in this respect *Castilloa* thrives well under conditions similar to those obtaining in young cacao fields, where bananas, pigeon peas, tannias, etc., are used as temporary shade.

The *Castilloa* does not appear to require shade from the sun after it reaches a height of about 8 to 10 feet.

PLANTING.

Three or four seeds may be sown in nicely prepared vegetable soil at each place where a tree is required, and the seedlings subsequently thinned out to one plant. This plan is not, however, recommended, since much better results will be secured by planting out young plants from bamboo pots or boxes, as the plants raised under nursery conditions are stronger, grow more rapidly, and soon become established in the plantation.

At each plant station, holes about 2 feet in diameter and 18 inches deep should be opened and the bottoms loosened with a fork and left to 'weather' for a week or two, and then filled in with surface soil to a height of about 6 inches above the general level. One plant should then be planted in the centre of each station, and in doing so care should be taken to transfer from the pots or boxes as much soil with the plant as possible, in order to avoid disturbing the roots too much. The same precaution should be taken in removing plants from nursery beds to the field, and before removing them from the nursery bed or pots the soil should be well wetted.

After the plant is placed in position, the soil drawn over the roots should be firmly pressed with the hand or feet, to make the plant secure and bring the soil into close contact with the roots, but at the same time care should be taken to avoid making the soil hard by too much pressure.

If the soil is not very rich, the plants will be greatly benefited by mixing a handful of bone meal with the soil when planting.

Planting operations should, if possible, be carried out in cloudy or rainy weather, preferably between the months of June and October. If a spell of dry weather should immediately succeed planting, precaution should be taken to prevent the plants suffering for want of water; a light covering of trash on the soil around the plants will be very useful for this purpose.

DISTANCE TO PLANT.

If planted as shade trees through cacao, a distance of 40 to 50 feet apart will probably be found close enough. The former distance will give twenty-seven trees to the acre, and the latter seventeen. In separate plantations, devoted entirely to this tree, the distance at which they should finally stand should not be less than 20 feet apart each way. They may either be planted at this distance at the outset or be put out at 10 feet by 10 feet with the object of thinning out the trees to 20 feet by 20 feet about the ninth year, after they have been tapped once or twice.

The advocates of the latter system claim that the cost of weeding is thereby reduced and that a greater yield of rubber is obtained per acre in the first year's tapping. The objections to this system are that the trees left after the thinning, are likely to be inferior in size and rubber-yielding qualities as compared with others of a similar age, but which had been planted at 20 by 20 feet, and as the result, would have developed more rapidly and perfectly, and also be likely to yield more rubber per tree in the first few years of tapping than would be obtained from those left after thinning a close-planted plantation.

The question as to which system would eventually be the more remunerative can only be settled satisfactorily by carefully conducted experiments.

The best results will, no doubt, be obtained where it is possible to cultivate annual catch crops between the trees, planted at the wider distance. This is the plan recommended.

RAISING PLANTS.

The *Castilloa* trees in St. Lucia produce seeds between April and June. If large quantities of seed are required, it is necessary to gather the red-coloured fruits from the branches as soon as ripe, as birds will, unless prevented, carry away a great many, and only a portion of the crop will be obtained if only the seeds which fall to the ground are gathered. The seeds do not long retain their vitality, and on this account it is advisable to sow them when freshly gathered. Should it be desirable to keep them for a few days, they may, after being removed from the pulp of the fruit, be washed and dried quickly in the shade, be mixed with some nearly dry soil or slightly damp powdered charcoal, and stored in a dry place.

The seeds when fresh take about sixteen days to germinate; they should be sown at least 2 inches apart and $\frac{1}{2}$ inch deep in well-drained nursery beds of fine rich soil or in boxes. If the plants are to remain more than a few weeks in the boxes or beds, the seeds should be sown farther apart. The seed boxes or beds must be suitably shaded from the sun and the soil kept moist but not wet. As the seedlings get to be a few inches high, the shade should be gradually lessened but not entirely removed. In this way the plants will be gradually hardened for the more exposed situations in the field.

The plants may, when about 1 foot high, be planted out in the fields; but stronger ones will be obtained by transplanting the smaller seedlings into bamboo pots and growing them in the nursery until about 2 feet high.

SUPPLY OF PLANTS.

Large numbers of plants are being raised at the Botanic Station at St. Lucia for distribution, and persons desiring to secure plants should apply to the Agricultural Superintendent without delay, particularly if large numbers are required, as only a small surplus stock can be maintained. Plants of *Castilloa elastica* are sold at the Botanic Station, in boxes of about fifty, at 9d. per box; or 3s. per 100 plants in bamboo pots.

EXPERIMENTS WITH RUBBER-YIELDING PLANTS.

For further information respecting rubber-yielding plants and their cultivation, also the results of recent tapping experiments carried out at the Botanic Station at St. Lucia and in other parts of the West Indies, the attention of readers is directed to the publications of the Imperial Department of Agriculture, particularly the *West Indian Bulletin*, (Vol. VII, pp. 16-29).

RUBBER CULTIVATION IN SAMOA.

The *Consular Report* on Samoa for 1905 contains the following account of the efforts that are being made to extend the cultivation of rubber trees in that country:—

The Samoa Caoutchouc Company, Berlin, capital £75,000 and upwards, has commenced operations on a large tract of ground at Saluafata, 12 miles from Apia, and has planted out many thousand seeds of *Hevea*. Rubber cultivation being an entirely new thing in Samoa, it is impossible to make a positive and certain forecast regarding it, but in the opinion of some it offers greater advantages than cacao or cocoa-nut planting. That *Castilloa* will grow here is quite certain; but until tapping has begun and the yield can be approximately ascertained, it is impossible to say whether this or any other rubber tree will yield sap to the same extent as is the case in their natural habitat; but, as conjectured above, this culture appears to be likely to yield, in any case, a profitable return on the capital invested.

Mr. T. Andrew, photographer and planter, is obliging enough to furnish the following:—

'In 1904 I supplied your yearly report with a few remarks on the cultivation of *Hevea brasiliensis* in Samoa. Since then the trees have grown rapidly; not so much in height as in girth—they are just six years old from the seed.

'Measuring twenty-five consecutive trees at 3 feet from the ground, the largest tree measured $24\frac{1}{2}$ inches in circumference; the average of the whole was $17\frac{1}{2}$ inches.

'Considering the fact that these trees have been entirely under native supervision, with the exception of occasional visits of the owners, it may reasonably be expected that, on plantations laid out by companies and under proper supervision, the trees will present a more promising appearance than do the above under the conditions stated.

'The measurements are by no means insignificant when compared with those made at the experimental gardens of the different districts of the zone of rubber culture.

'The trees in question are planted 15 by 15 feet among cacao trees, at an altitude of 1,100 feet above the sea. The aspect is favourable, and the distribution of rain is more even than on the low-lying lands which have the same aspect.

'Some of the trees are being tapped, and the result of yield and quality of the rubber will be looked forward to with interest by those engaged in the culture, and by others who are waiting for proofs of the results of the experiments.

'The high prices prevailing for first-class articles, and the apparently permanent demand for rubber, have given a considerable impetus to rubber cultivation in Samoa.

'Other companies under able management have commenced operations here. Notably the Berlin Caoutchouc Company at Saluafata, near Falefa, with an area of 6,000 to 7,000 acres. Their first clearing of 500 acres is now ready for planting out, and they have about 1,000,000 young *Hevea* plants growing in the nurseries. The situation of this estate is ideal: a gradual ascent from the sea, with a maximum height of, say, 600 feet above it; the rainfall is evenly distributed throughout the year. The soil is splendid, containing sufficient clayey mixture to retain moisture in the event of prolonged dry weather. The whole is almost encircled by a high range of mountains 1,500 to 2,500 feet in height.

'Next comes Mr. Harman's (Birmingham) Upola rubber plantation. As yet there are no details respecting the operations of this company; but, judging from the rapid progress made by the Upola Cacao Company, which is under the same management, a promising prospect may safely be predicted.'

MARKET REPORTS.

London,—June 27, 1906. Messrs. KEARTON, PIPER & Co.; Messrs. E. A. DE PASS & Co.; 'THE WEST INDIA COMMITTEE CIRCULAR'; 'THE LIVERPOOL COTTON ASSOCIATION WEEKLY CIRCULAR,' June 22; and 'THE PUBLIC LEDGER,' June 23, 1906.

ALOES—Barbados, 15/- to 60/-; Curaçoa, 20/- to 55/- per cwt.
ARROWROOT—St. Vincent, 2d. per lb.
BALATA—Sheet, 1/4 to 1/11; block, 1/4 to 1/4½ per lb.
BEES'-WAX—£8 12s. 6d. to £9 2s. 6d. per cwt.
CACAO—Trinidad, 57/- to 63/- per cwt.; Grenada, 51/- to 56/- per cwt.
CARDAMOMS—Mysore, 7½d. to 3/- per lb.
COFFEE—Jamaica, good ordinary, 39/- to 41/- per cwt.
COTTON—West Indian, medium fine, 6·60d.; West Indian Sea Island, medium fine, 13½d.; fine, 14½d.; extra fine, 16d. per lb. Prices paid, 8d. to 15d. per lb.
FRUIT—
BANANAS—Jamaica, 4/- to 6/- per bunch.
GRAPE FRUIT—16/- to 20/- per case.
LIMES—4/- to 4/6 per box.
PINE-APPLES—Antigua, 10/- to 18/- per barrel.
FUSTIC—£4 to £4 10s. per ton.
GINGER—Jamaica, 58/- to 65/- per cwt.
HONEY—Good to bright amber, 21/- to 24/-; dark to fair liquid, 17/- to 20/6 per cwt.
ISINGLASS—West Indian lump, 1/10 to 2/3; cake, 1/2 to 1/3 per lb.
KOLA NUTS—4d. to 6d. per lb.
LIME JUICE—Raw, 11d. to 1/3 per gallon; concentrated, £20 10s. per cask of 108 gallons; hand-pressed, 2/6 per lb. Distilled Oil, 2/6 per lb.
LOGWOOD—£4 to £4 15s.; roots, £3 10s. to £4 per ton.
MACE—Fair to pale, 1/6 to 1/9; reddish, 1/4 to 1/5; fair to good red, 1/3 to 1/4 per lb.
NITRATE OF SODA—Agricultural, £11 7s. 6d. per ton.
NUTMEGS—56's, 2/4; 60's, 1/11; 68's, 1/2; 74's, 10½d.; 83's, 10d.; 92's, 8½d.; 98's, 7½d.; 112's, 6½d. per lb.
PIMENTO—Fair, 2½d. to 2¾d. per lb.
RUM—Jamaica, 2/1; Demerara, 9½d. per proof gallon.
SUGAR—Yellow crystals, 14/6 to 15/- per cwt., Muscovado, 13/- to 14/6 per cwt.; Molasses, 10/- to 14/6 per cwt.
SULPHATE OF AMMONIA—£11 17s. 6d. per ton.

Montreal,—June 1, 1906.—Mr. J. RUSSELL MURRAY.
(In bond quotations, c. & f.)

COCOA-NUTS—Jamaica, \$26·00; Trinidad, \$24·00 per M.
COFFEE—Jamaica, medium, 10c. to 11c. per lb.
GINGER—Jamaica, unbleached, 16c. per lb.
MOLASCUIT—Demerara, \$1·00 per 100 lb.
MOLASSES—Barbados, 28½c.; Antigua, 23½c. per Imperial gallon.
NUTMEGS—Grenada, 110's, 17c. to 19c. per lb.
PIMENTO—Jamaica, 5½c. per lb.
SUGAR—Grey crystals, 96°, \$1·93¾ per 100 lb.
—Muscovados, 89°, \$1·30 to \$1·40 per 100 lb.
—Molasses, 89°, \$1·25 to \$1·40 per 100 lb.
—Barbados, 89°, \$1·40 to \$1·50 per 100 lb.

New York,—June 29, 1906.—Messrs. GILLESPIE BROS. & Co.

CACAO—Caracas, 13c. to 13½c.; Grenada, 11¼c. to 11½c.; Trinidad, 11¼c. to 12c.; Jamaica, 11c. to 11½c. per lb.
COCOA-NUTS—Jamaica, \$22·00; Trinidad, \$23·00 per M.
COFFEE—Jamaica ordinary, 8c. to 8¼c.; good ordinary, 8¾c. per lb.
GINGER—Dark scraggy root, 10c. to 11½c.; white to bright bold, 11¾c. to 13½c. per lb.
GOAT SKINS—Barbados, Dominica, and Antigua, 58c.; Jamaica, 58c.; St. Kitt's, 51c. to 52c. per lb.
GRAPE FRUIT—Jamaica, \$5·00 to \$8·00 per barrel; \$3·00 to \$4·00 per box.
LIMES—\$5·50 to \$6·00 per barrel.
MACE—28c. to 31c. per lb.

NUTMEGS—West Indian, 80's, 21c. to 22c.; 90's, 17c. to 18c.; 110's, 14½c.; 130's, 12c. per lb.
ORANGES—Jamaica, \$4·00 to \$4·50 per barrel; \$2·00 to \$2·25 per box.
PIMENTO—4¾c. to 5½c. per lb.
SUGAR—Centrifugals, 96°, 3·61c. to 3·64c.; Muscovados, 89°, 3·11c. to 3·14c.; Molasses, 89°, 2·86c. to 2·89c. per lb., duty paid.

INTER-COLONIAL MARKETS.

Antigua,—May 31, 1906.—Messrs. GEO. W. BENNETT BRYSON & Co., LTD.

SUGAR—\$1·40 per 100 lb.

MOLASSES—18c. per gallon.

Barbados,—July 10, 1906.—Messrs. T. S. GARRAWAY & Co., and Messrs. JAMES A. LYNCH & Co., July 16, 1906.

ARROWROOT—St. Vincent, \$4·00 to \$4·25 per 100 lb.

CACAO—\$10·50 to \$11·25 per 100 lb.

COCOA-NUTS—\$11·00 per M. for husked nuts.

COFFEE—\$10·50 to \$11·75 per 100 lb.

HAY—\$1·10 per 100 lb.

MANURES—Nitrate of soda, \$60·00; Ohlendorff's dissolved guano, \$55·00; Cotton manure, \$48·00; Cacao manure, \$45·00; Sulphate of ammonia, \$75·00; Sulphate of potash, \$67·00 per ton.

ONIONS—Bermudas, \$2·00; Madeira, \$3·00 to \$3·50; per 100 lb.

POTATOS, ENGLISH—\$2·88 per 160 lb.; Nova Scotia, \$3·25 per 160 lb.

RICE—Ballam, \$5·20 to \$6·00 per bag (190 lb.); Patna, \$3·00 to \$3·40; Rangoon, \$2·75 to \$2·80 per 100 lb.

SUGAR—Muscovados, 89°, \$1·50; Dark crystals, 96°, \$1·90 per 100 lb.

British Guiana,—July 14, 1906.—Messrs. WIETING & RICHTER.

ARROWROOT—St. Vincent, \$8·00 per barrel.

BALATA—Venezuela block, 25c.; Demerara sheet, 38c. per lb.

CACAO—Native, 12c. to 13c. per lb.

CASSAVA STARCH—\$3·50 per barrel.

COCOA-NUTS—\$10·00 to \$12·00 per M.

COFFEE—13¾c. to 14c. per lb.

DHAL—\$5·00 to \$5·20 per bag of 168 lb.

EDDOES—\$1·44 per barrel.

MOLASSES—15½c. per gallon.

ONIONS—Tenerife, 2¾c.; Bermuda, 2c. per lb.

PLANTAINS—20c. to 60c. per bunch.

POTATOS, ENGLISH—\$4·00 to \$4·50 per barrel.

POTATOS, SWEET—Barbados, \$1·92 per bag.

RICE—Ballam, \$5·75 per 177 lb.; Creole, \$5·50 per bag (ex store).

SPLIT PEAS—\$6·25 per bag (210 lb.).

TANNIAS—\$2·88 per barrel.

YAMS—White, \$2·64; Buck, \$3·50 per bag.

SUGAR—Dark crystals, \$2·00; Yellow, \$2·30 to \$2·50; White, \$3·25 to \$3·50; Molasses, \$1·40 to \$1·60 per 100 lb. (retail).

TIMBER—Greenheart, 32c. to 55c. per cubic foot.

WALLABA SHINGLES—\$3·00, \$3·75, and \$5·25 per M.

Trinidad,—July 14, 1906.—Messrs. GORDON, GRANT & Co.

CACAO—Ordinary to good red, \$11·75 to \$11·90; estates, \$12·25 to \$12·50 per fanega (110 lb.); Venezuelan, \$13·00 to \$13·25 per fanega.

COCOA-NUTS—\$20·00 per M., f.o.b.

COCOA-NUT OIL—68c. per Imperial gallon (cask included).

COPRA—\$3·50 to \$3·70 per 100 lb.

DHAL—\$4·40 to \$4·50 per 2-bushel bag.

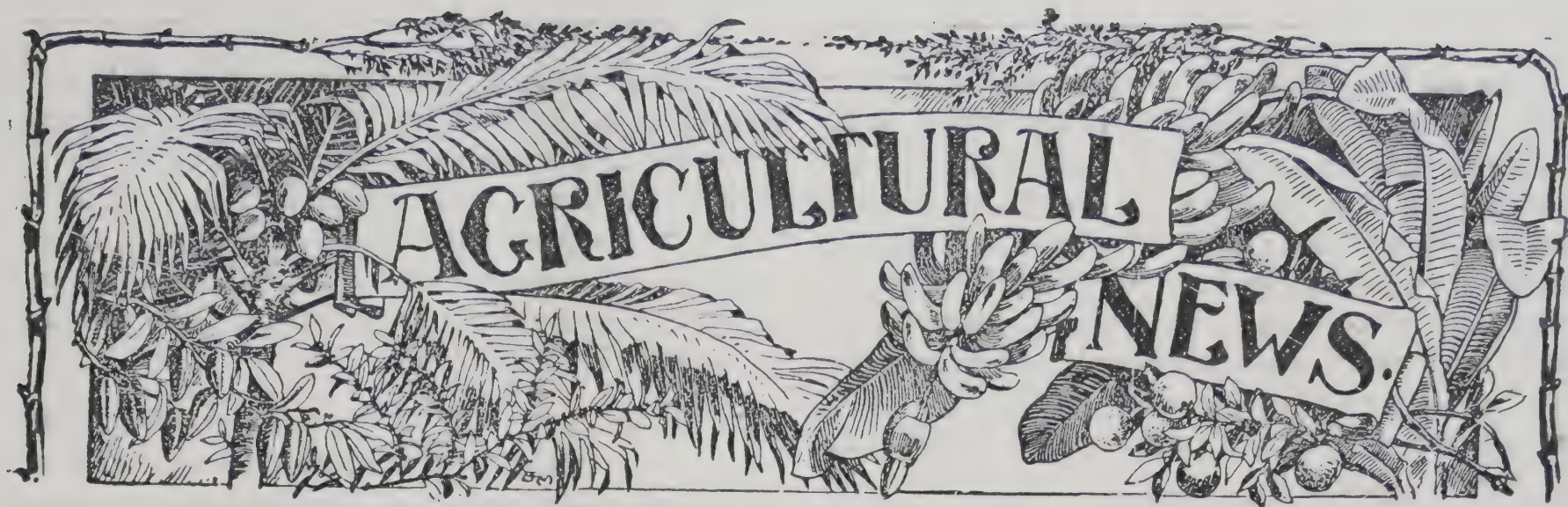
ONIONS—\$1·25 to \$2·00 per 100 lb. (retail).

POTATOS, ENGLISH—\$2·25 to \$2·30 per 100 lb.

RICE—Yellow, \$5·20 to \$5·50; White, \$5·00 to \$6·00 per bag.

SPLIT PEAS—\$5·50 to \$5·60 per bag.

SUGAR—Yellow crystals, \$2·00 to \$2·25; Molasses, \$1·50 to \$2·00 per 100 lb.



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Improvement of Cotton by Seed Selection.

THE new number of the *West Indian Bulletin* (Vol. VII, no. 2), issued to-day, contains an interesting paper, by Mr. Thomas Thornton, A.R.C.S., on the 'Improvement of Cotton by Seed Selection.'

The importance of seed selection in connexion with the cotton industry is being recognized in almost every cotton-growing country. The lead in this direction has been taken in the United States, and in the Sea Islands seed selection and cotton planting have long been regarded as inseparable; but the matter has also been taken up in the West Indies, in Egypt, and in Africa, and now on a very extensive scale in India. A detailed account of the methods adopted by growers in the Sea Islands for improving their cotton was published in the *West Indian Bulletin* (Vol. IV, pp. 208-14).

Experience has shown that cotton is much influenced by change of environment, and the cotton plant varies very considerably in the way in which it responds to the influences of its environment. As a consequence, it is found that the cotton produced in the various West India Islands differs very much in its characters; not only that, but the cotton grown in various parts of the same island also differs considerably.

It will readily be understood, therefore, that there is much danger of producing a very mixed crop. Mixed cotton in the spinning factory is disastrous. One of the most important things that the spinner notes in buying cotton is uniformity—uniformity in colour, length, fineness, and silkiness. It is essential, therefore, that every effort should be made to secure this uniformity. At the same time, in selecting cotton seed for propagation purposes, attention has to be paid to the matter of yield. Some plants will be found to produce four or five times as much seed-cotton as others; as it is probable that this character of productiveness will be passed on to the offspring, efforts are made to select seed from heavy-yielding plants.

The only way to obtain the best results, both as regards quality of staple and yield of seed-cotton, is to practise a rigorous system of seed selection. It has been stated that the cotton plant shows a pronounced tendency to variation, and this is particularly emphasized in the rapid manner in which the quality of cotton deteriorates as soon as seed selection is discontinued. The cotton grower must therefore realize the necessity of applying a system of seed selection year after year, with a view to maintaining, and possibly also improving, the quality of his crop.

Proposals for carrying out a system of seed selection in the West Indies were discussed in an editorial in a previous issue of the *Agricultural News* (Vol. IV, pp. 385-6). The work involved in these proposals is dealt with by Mr. Thornton in the paper under review.

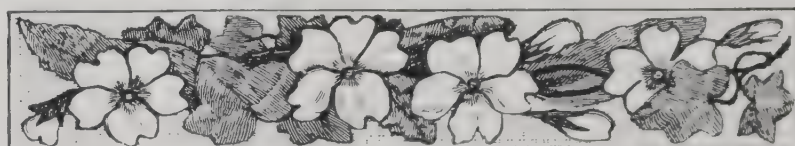
Selection was commenced in the field when the bolls were just beginning to open. The healthiest, most vigorous, and best-shaped plants to be found on seven estates in Barbados were selected. These were free from disease, having as few large branches from the bottom of the primary stalk as possible, and of medium height (not more than 5 feet 6 inches). They were plants producing good-sized bolls, distributed generally over the plant. It was also possible to make in the field a rough examination of the lint. Only those plants which produced long fibre and seeds neither covered with, nor entirely free from, fuzz were selected. The total number of plants that passed this field examination was 264. The lint from these plants was picked into separate bags, which, at the end of the picking season, were sent to the Head Office of the Imperial Department of Agriculture, in order that the samples could be subjected to further examination in the laboratory.

The process then adopted was a system of elimination. By a preliminary cursory examination a large number of samples, which showed clean, black seeds, or short or coarse lint, were discarded. The succeeding examination was according to the scheme fully set forth in the *Agricultural News* (Vol. V, p. 38). At each step the unsatisfactory samples were eliminated, only those which proved to be satisfactory being retained for further examination.

The characters for which the samples were examined were: (1) length of staple and uniformity of length; (2) weight of seed-cotton per plant; (3) weight of seed-cotton per boll; (4) proportion of weak fibre; (5) proportion of lint to seed; (6) proportion of lint per plant; (7) diameter of fibres; and (8) general appearance, including fineness and silkiness.

The seed from these finally selected plants has now been disinfected and distributed to the different estates on which it was produced. The planters have been advised to set aside small plots of land as nurseries for this seed; these were to be situated away from, and to windward of, all other cotton fields; the seed to be sown one to the hole only, in single rows 6 feet apart, and 2 feet apart in the row.

The thanks of the Department are due to the owners and managers of the various estates for their assistance in the conduct of these experiments, which cannot fail to be of considerable value to the cotton industry in the West Indies.



SUGAR INDUSTRY.

Sugar-cane Diseases in Antigua.

The Hon. Francis Watts, C.M.G., D.Sc., has forwarded the following memorandum on sugar-cane diseases in Antigua:—

Having seen evidence of rind fungus in a few localities and of root fungus in several, I deemed it prudent to direct the attention of planters to the subject of diseases amongst their sugar-canes, and to this end the following circular, with its attached questions, was sent to sixty-one estates. Thirty-eight replies were received:—

Antigua, May 21, 1906.

Dear Sir,—Having recently observed an appreciable quantity of diseased cane in Antigua, it appears to me desirable to make careful inquiry as to the extent and nature of cane diseases as observed during the present reaping season.

2. In view of the great injury to the sugar industry caused by cane diseases in the early 'nineties' and in order that any possible recurrence of disease may be promptly met, planters are, in their own interests, earnestly requested to reply to the inquiry now made; in addition to answering the specific questions, they are asked to give any information which may throw light on so important a matter.

3. Cane diseases may be classed as insect and fungoid.

The principal insect enemies are: moth borer, weevil borer, and root borer. These are well known to planters, and are described in the *West Indian Bulletin*, Vol. VI, pp. 37-47.

The principal fungoid diseases are rind fungus, which causes the cane to rot, and is well known as the principal disease prevalent some twelve years ago, and root fungus. This latter is recognized by the presence of a white fungus which causes the old leaves (trash) to remain attached to the stem instead of falling off and leaving the stem clean, as should happen in healthy canes. Canes attacked by root fungus usually have the appearance of suffering badly from drought. The fungoid diseases of cane are described in the *West Indian Bulletin*, Vol. VI, pp. 33-7.

It is particularly requested that a reply be received not later than June 16:

Yours truly,

(Sgd.) FRANCIS WATTS,

Government Chemist and
Superintendent of Agriculture.

1. Have you observed any appreciable amount of disease among your canes during the present season?
2. Is disease more prevalent than during the past five years?
3. What kinds of disease are most prevalent?
4. Is disease confined to, or more prevalent in, any particular locality?
5. Which suffer more—plants or ratoons?
6. Are any particular varieties of cane attacked worse than others? if so, what are they, and by what diseases are they attacked?
7. Do any particular varieties of cane appear to be conspicuously free from diseases? if so, what varieties are they?
8. State any facts of interest which have come under your notice, bearing on the subject of cane diseases.

The object of the inquiry was two-fold: to ascertain whether, in the opinion of the planters themselves, there is any appreciable amount of disease present in their canes and whether this is increasing, and also to arouse a lively and critical interest in the question of cane diseases, so as to prevent any insidious attack of disease from obtaining a foothold before general attention is called to it.

In only four out of the twenty-eight replies is it suggested that there is any appreciable amount of disease present this season; the other thirty-four replies are to the effect that there is no appreciable amount of disease. Of the two who report an appreciable amount of disease, one observer says that there is not very much, while the other says it is confined to small patches; another reports a little root disease, while the fourth refers to injuries from insect pests.

The replies are almost unanimous in stating that disease is less prevalent than during the past five years. One observer says he thinks that in his district diseases are slightly more prevalent this year, while another expresses the belief that the moth borer is increasing.

The replies are conclusive evidence that the planters themselves regard their canes as reasonably free from disease and that they think diseases are less prevalent than during the past five years; even those who do not expressly agree with these two statements only refer to small amounts of disease. This is important evidence and satisfactory as far as it goes, but it is hoped that planters will not thereby be lulled into a false sense of security but rather be stimulated to further, more critical, and more systematic observation during the coming season.

As planters find so little evidence of disease, not many points of importance are brought forward respecting the diseases themselves. There are several references to the existence of small amounts of root fungus and a smaller number to small amounts of rind fungus.

Several observers express the opinion that diseases (presumably fungoid diseases) are more prevalent where the soil conditions are unfavourable, for example, upon heavy, badly drained clay soils, or upon thin, dry soils on hillsides. The suggestion is put forward that plant canes are more attacked by rind fungus and ratoon canes by root fungus. It is admitted by many that the Bourbon cane is so liable to attacks of rind fungus that it can no longer be profitably grown. Several allusions are made to small amounts of disease in the White Transparent cane: this disease would appear chiefly to be root fungus. This is somewhat significant and planters should keep a careful watch upon this widely cultivated variety.

Two references are made to the prevalence of moth borer in B. 208, and in one case the Uba cane is referred to as badly attacked by this pest.

There are many references to B. 147 as showing considerable resistance to disease; it appears to offer resistance to root fungus—a point of some importance.

The manager of Gunthorpe's Factory states his impression that the following canes show freedom from disease in the order named: B. 147, Sealy Seedling, B. 208, B. 109, D. 95; his observations are confirmed in a general manner by several observers.

From the inquiry we gather that the planters themselves are of opinion that no serious amount of disease exists amongst their canes at the present time, and that, on the whole, the amount is less than it was during the past five years—a statement of very considerable importance.

Dealing with the kinds of cane grown, it is admitted that the Bourbon is so badly attacked by disease as to be unprofitable; White Transparent is showing some signs of attack, chiefly of root fungus. As a variety resistant to diseases, B. 147 is well spoken of, so also are Sealy Seedling, B. 208, B. 109, and D. 95.

These points, I think, sum up the principal views of the leading planters, who, I believe, hold the opinion that there is no immediate cause for anxiety in the matter of cane disease, but they recognize that constant vigilance is necessary.

On the whole, I concur in these views, but I am inclined to think that the insidious nature of the attack in the case of root fungus leads planters very frequently to overlook its existence except in bad cases. Very often the crop may be seriously lessened by the presence of root fungus without any appreciable amount of dead canes being seen. As is now known, the root fungus attacks the tips of the roots and by destroying them prevents the cane from obtaining a full supply of moisture from the soil, hence there is often confusion between the effect of drought and the effect of root fungus. My own observations lead me to think that root fungus is more widely distributed than planters imagine and I would urge their very careful attention to this point.

The remedies for root fungus appear to be the planting of other crops than cane for a year or two. Cotton makes an excellent rotation crop in this respect: there are at the present moment several good illustrations of this, where canes are now growing vigorously after a crop of cotton in localities previously badly affected by root fungus. In the replies to questions under consideration, one planter directed attention to good results in combating root fungus by growing sweet potatoes as a rotation crop. In addition to rotation of crops, a further means of combating the disease lies in the selection of resistant varieties of cane: of these, B. 147, Sealy Seedling, B. 208, B. 109, and D. 95 are favourably spoken of.

TOBACCO CULTIVATION IN PORTO RICO.

The following reference to tobacco growing in Porto Rico is made in the *Consular Report* on the island's trade for 1905:—

Tobacco during the year considerably improved its position amongst the most valuable staples of export in the island, both in quality and quantity, through the more scientific methods of cultivation now adopted. Most attention was paid to the production of a superior wrapper, which has resulted in a leaf being grown under 'cheese cloth' cover, which, with the improved filler tobacco now grown, makes a cigar that compares well with the best of Havana brands.

One company alone has 250 acres under shelter, and large tracts of new land are in course of preparation for the same sort of planting.

Tobacco to the value of £659,626 was exported during the year, of which £547,326 worth was manufactured.



WEST INDIAN FRUIT.

LEMON MARKET.

With a view to ascertaining the possibility of establishing a trade in lemons at Dominica, an inquiry was addressed by the Imperial Commissioner of Agriculture to Messrs. Gillespie Bros. & Co., of New York, who have written, under date July 6, as follows:—

With reference to your valued favour of May 15, on the subject of the culture of lemons, we have now obtained the following information:—

(a) The new crop of Sicilian lemons goes to market in November.

(b) They are in season all the year round.

(c) They are usually packed in closed boxes, not as is the case with oranges, in open crates. Each box contains 300, 350, 420, or 500 lemons.

(d) With reference to the price obtained for Sicilian lemons, it is impossible to name an average price as so much depends on the supplies coming forward from California and Sicily, and as these supplies come in constantly all the year round there is no season of the year when one can be certain of a scarcity of fruit, as is the case with oranges in September and October. This year, during the first few months, receipts were small and prices good. At present the fruit is more plentiful and prices are lower, but this must not be taken as a guide to the market, nor can one year's returns be regarded as a precedent for another.

From the foregoing you will observe that as the supplies are pretty constant from Sicily, lemons shipped from Dominica would of necessity come into competition with the Sicilian variety, no matter at what season of the year they might be shipped.

As regards the price that might be obtained for Dominica fruit, that will be largely dependent on the quality of the fruit and the condition of the market, and without a sample or a trial shipment to test the market it is impossible to give any opinion that would be of value.

Messrs. Gillespie Bros. & Co. have also forwarded the following extract from the *New York Times*, of July 10:—

With the arrivals by steamer to-day, there are now 200,000 boxes, or 70,000,000 lemons unsold on shipboard in the harbour of New York. This enormous accumulation has been brought about by peculiar market conditions. The market was high early in the season, and the shipments of lemons have been very heavy. The market declined, and the receivers here adopted a policy of postponing sales until the market became better, but it did not improve as expected.

The supplies will now be turned loose, 74,500 boxes being scheduled for sale at auction this week. The average box contains 350 lemons, so that it may be seen that the sales this week will be 25,255,000 lemons.

Ninety days ago, the bulk of the lemon sales here were being made upon a basis of between \$4 and \$5 per box. Now the bulk are being sold at about \$2.50. For the best lemons, however, prices are still being maintained upon a basis of between \$4 and \$5. The bulk of the stock, however, is not of the best.

These lemons were bought under contract, and it is conservatively estimated that the importers have already lost \$150,000 on the season, and that the losses will reach \$500,000, if conditions do not change before the end of the season.

MANGO BREEDING.

A recently issued bulletin, entitled 'The Mango in Hawaii,' deals fully with the cultivation, propagation, and uses of this fruit. The following reference is made to the breeding of the best varieties:—

The simplest method of propagation is by seeds, but this has the disadvantage of being unreliable in reproducing the exact variety; there is no certainty of seed reproducing its variety. This is partly because of the natural habit of variation and partly because the flowers are crossed frequently with foreign pollen. The greater number of the mangos grown in this and every other country, however, are seedlings, and this method will probably prevail for some time to come.

Plant breeding is coming to be a very important element in commercial horticulture. It is, however, only in its infancy as an art, and doubtless will be the instrument of great advancement in many industries. The mango will unquestionably receive the attention of plant breeders in the tropics, and new varieties, probably superior in many ways to those now known, will be produced. The aim of the mango breeder will be, among other things, to produce a fruit entirely lacking in fibre. It may also be sought to produce a seedless mango, and certainly much might be done to lengthen the season by producing extra-early and extra-late kinds. The results of accidental crosses are manifest to the careful student of this fruit. In fact, the superior varieties from India, which are now propagated by grafting and budding, are probably in large part the result of beneficial but accidental crosses. If this be so, it lends much encouragement to the breeder who will study the characteristics of fruits and so cross them as to combine the best qualities of two or more different kinds in one variety.

INCUBATOR TRIALS IN DOMINICA.

On p. 154 of this volume of the *Agricultural News*, a note was published giving the results of incubator trials in St. Lucia. A similar incubator has been tried at the Dominica Agricultural School with results which appear to be highly satisfactory.

In forwarding the following statement of the results obtained, the Officer-in-charge of the school (Mr. A. J. Brooks) mentions that many people in Dominica have incubators. Mr. Brooks' notes on feeding the chickens after incubation are likely to be useful to persons using incubators:—

In May last, a Cypher 120-egg capacity incubator (1906 pattern No. 1) and brooder complete was received from the Imperial Commissioner of Agriculture. Three trials have been made, the results of which may prove interesting and instructive to poultry keepers.

The eggs incubated consisted of the following breeds:—Plymouth Rock, Leghorn (white), Orpington (buff), Indian Game, and the common local cross-breeds. The local eggs being much smaller than the pedigree eggs, the incubator was capable of holding from 150 to 160 at each filling.

NUMBER OF EGGS INCUBATED.

Trial.	Plymouth Rock.	Buff Orpington.	White Leghorn.	Indian Game.	Cross-breed.	Total eggs.
1st.	10	7	9	2	113	141
2nd.	10	5	8	7	54	84
3rd.	26	8	17	13	90	154
Total	46	20	34	22	257	379

TABLE SHOWING PERCENTAGE OF EGG FERTILITY.

Breed.	Number of eggs incubated.	Infertile eggs tested out.	Fertile eggs.	Successfully hatched.	Percentage.
Indian Game	10	4	6	6	100.0
Leghorn (White) ...	34	10	24	21	87.5
Plymouth Rock	46	9	37	30	81.0
Cross-breed ...	269	151	118	75	63.5
Orpington ...	20	2	18	11	61.0
Total ...	379	176	203	143	70.0

Seventy per cent. of the fertile eggs hatched successfully. Incubation lasted twenty-one days, after which the chicks were accommodated in a brooder for the first week to 90° F.

The second week the heat was reduced to 60° F.; during this time they were confined to the brooder.

The third week they were kept in this heated brooder and given a limited covered earth run.

The heat was then removed, and the chicks allowed to occupy the cold brooder for two more weeks.

After five weeks the cold brooder was removed, and the chicks were placed in a large house without a grass run (perches will be provided after the twelfth week). The floor of the brooder was covered with sand and grit to a depth of $\frac{1}{4}$ inch; upon this was placed a layer of finely cut straw and dry grass.

All food supplied to the chicks during the first few weeks was scattered among this litter, so as to cause the birds to scratch for their food. This is beyond doubt one of the most essential points to be observed in successful rearing, as it causes the chick to take a fair amount of exercise in obtaining its food, which tends to keep it in a healthy condition. During the time the chicks occupied the brooder, fresh green food was supplied twice a day; this consisted of spinach, alfalfa, and cabbage leaves, the whole of which was passed through a closely set clover cutter and thoroughly mixed up previous to being fed.

After the first three weeks it is better to supply the green food whole by suspending it within easy reach of the chicks. Dry food should be given four or five times each day. 'A little and often' should be the rule; if the chicks are fed but twice a day, it causes them to stuff their crops and become lazy. Such birds seldom survive the twelfth week. On the other hand, if a little food is supplied about every three hours the chicks are kept in constant exercise.

Incorrect feeding is usually the chief cause of mortality among chicks, this generally resulting from diarrhoea, or from the birds becoming crop-bound.

The following dietary can be fully recommended: The first two weeks, egg and bread should be given. The egg should be boiled until it is quite hard, and the whole of it—yolk, white and shell—minced and thoroughly mixed with stale bread. This may be given the first thing in the morning and the last thing at night. During the day coarse oatmeal should be given (raw) every three hours.

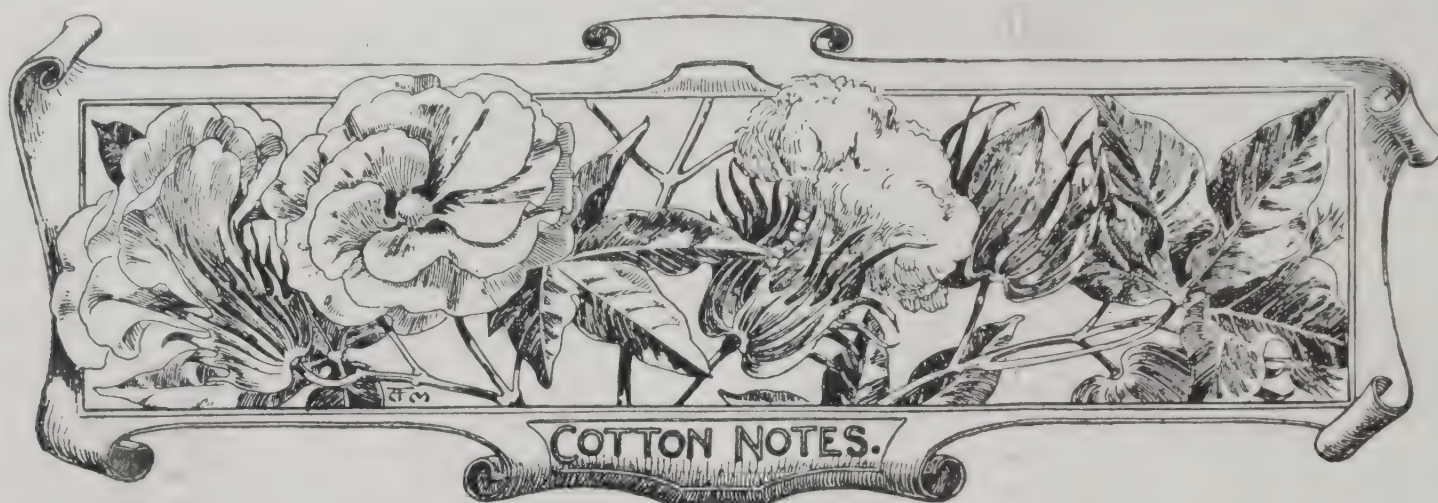
From the time the chicks are two days old a limited amount of animal food should always be given. This may be supplied in the form of wood-ants, maggots, worms, etc. In the event of these being unobtainable, minced raw meat, scraps, and ground bone should be given. During the third, fourth, and fifth weeks, brown rice may be substituted for the egg and bread, this being fed alternately with the oatmeal. After this time, any of the following foods may be given: finely ground corn, ground oats, barley, buckwheat, etc., or cornmeal mixed with hot water and made into a crumbly mass, so that when thrown to the birds it falls apart easily. A good supply of grit must always be obtainable; broken oyster shell is an excellent material.

There are a few diseases to which chicks and chickens are more liable than full-grown fowls, and the following are the most common:—

Cramp.—This is usually caused by confinement and dampness. The chick, in slight attacks, walks on the outside of the foot: in severe attacks, it is unable to move, the legs and feet being contracted. Remove the chicks attacked and bathe legs and feet in warm water three or four times a day; after each bathing rub the limbs with embrocation. Then place chicks in the warm nursery of the incubator or in a basket lined with flannel and put in a warm, dry place.

Diarrhoea.—When chicks are noticed to be suffering from this complaint, they should be removed and fed on rice, well boiled and sprinkled with finely powdered chalk or bone dust.

Crop-bound.—In the case of young chicks and chickens suffering from this complaint, there is practically no cure, the birds being too small and weak to be successfully operated on. In this case the prevention is easier than the cure. Crop-bound is usually caused by overfeeding on hard and indigestible food with insufficient grit; therefore, feed little and often and see that the food is well ground and mixed.



WEST INDIAN COTTON.

Messrs. Wolstenholme and Holland, of Liverpool, report as follows, under date of July 10, 1906, in regard to the West Indian cotton market:—

Since our last report, dated June 26, a fair business has been done in West Indian Sea Island descriptions at rather easier prices.

There continues to be a fair demand for cotton at 12*d.* to 14*d.*, but above that figure there is practically no inquiry, except for a few bales of superfine cotton, occasionally, at 17*d.* to 20*d.*

Qualities, say, 'good' to 'fine,' only interest buyers when obtainable at 14*d.* to 15*d.*, and we think this may continue, the reason being that consumers only require substitutes for Florida and inferior island cotton at about this price, and for crop lots of island at 17*d.*

Many of the recent arrivals show want of stamina in the fibre, evidently the result of drought.

The sales include Nevis, 13*d.* to 14*d.*; Barbados, 14*d.* to 15*d.*; Antigua, 14½*d.* to 17½*d.*; St. Thomas, 13½*d.* to 14½*d.*; and St. Vincent (stained) 7½*d.* to 9*d.*

COTTON AS A CATCH CROP IN ST. KITT'S.

To the Editor of the *Agricultural News*.

Sir,—I send you below a summary of the working and results of this crop for the past season on the two estates in St. Kitt's, as to which I wrote you last year a letter published in your issue of April 8, 1905 (Vol. IV, pp. 102-3):—

	Estate A.	Estate B.
Area in cotton ...	41 acres	44½ acres
Rainfall from May to April...	52 inches	61 inches
First sowings ...	April 1905	May 1905
Reaping ended ...	March 1906	March 1906
Total weight seed-cotton ...	24,134 lb.	38,548 lb.
„ shipping weight, lint...	6,646 „	9,765 „
Average proportion of lint to seed-cotton...	27.04 per cent.	25.34 per cent.
Average lint per acre ...	161 lb.	219 lb.
„ cost „ „ ...	£3 12s. 5 <i>d.</i>	£4 12s. 4 <i>d.</i>
„ return per acre ...	£8 19s. 11 <i>d.</i>	£10 19s. 1 <i>d.</i>
„ clearance per acre...	£5 7s. 6 <i>d.</i>	£6 6s. 9 <i>d.</i>
„ price obtained per lb. lint ...	13.32 <i>d.</i>	11.98 <i>d.</i>

Last year the value of the cotton seed was deducted from the cost of growing; this year there is no such deduction; the crushed seed was used as cattle food and went back to the fields as manure. Last year cotton was charged 25s. per acre for manure for subsequent principal crop. No such charge has been made this year.

Estate A suffered but little from pests: on estate B one field was practically destroyed by the leaf-blister mite; sulphur and lime were applied with very poor results; the bush was burned. The manager reports that there have been no visible ill effects of catch crop on subsequent crops.

I am, etc.,

(Sgd.) ARTHUR M. LEE.

9, Fenchurch Avenue,

London, E.C. July 5, 1906.

SEASONABLE NOTES FOR COTTON GROWERS.

Those who have not yet planted their seed are again recommended to be most careful to have it disinfected before it is planted. Where the planter is disinfecting his own seed, he can do this immediately before planting, steeping the seed for twenty minutes in the corrosive sublimate solution, then washing for ten minutes in fresh water, and afterwards carrying it out into the field and planting at once.

It is a very bad policy to crowd cotton plants, as it will result in a considerably diminished crop. Plant in single rows, and when about four weeks old, single them out so that only one plant is left to the hole.

Every planter who has put in his seed should have on hand a stock of Paris green. As much as 3 lb. for every acre of cotton planted should always be on hand.

If proper bags for dusting Paris green are not available, no time should be lost in having them made. The best material for making the bags is the cloth known as 'ticklingburg.' Where coarse bagging material is used, large quantities of Paris green are wasted.

As cotton worms have already made their appearance, the plants should be most carefully watched, so that they may be dusted with Paris green immediately the worm is seen.

Last year a few planters tried powder guns, which gave much satisfaction. Those using them claim that there is a great saving in Paris green, and that the poison is especially well distributed. One man using a gun can dust as much as 6 acres a day.

The Acme powder bellows will this year receive a fair trial. They are cheaper than the powder guns and appear to do very good work.

Both the powder gun and the bellows have an important advantage over the bags in that they can be used early in the morning, while the dew is still on the plants, a condition which causes the Paris green to adhere to the leaves. If the bags are used when the plants are damp they get wet, and the dust refuses to pass through them.

THE PRESENT POSITION AND PROSPECTS OF THE SEA ISLAND COTTON INDUSTRY IN THE WEST INDIES.

The following is a summary of a lecture delivered by Sir Daniel Morris, K.C.M.G., D.C.L., D.Sc., Imperial Commissioner of Agriculture for the West Indies, at the West India Committee Rooms on July 19:—

The Sea Island cotton is a long-stapled variety possessing great strength and fineness. The best sorts are used for making Brussels lace, frilling, and other delicate fabrics, also gloves and handkerchiefs, as well as, in some instances, the sails of yachts, the tyres of motors, and durable mail bags. Hitherto the available supply of the best qualities of this cotton has been obtained from the Sea Islands off the coast of South Carolina; somewhat lower qualities have been obtained from certain districts in Florida and Georgia. The total production from all sources during the last ten years has averaged 90,000 bales of 400 lb. each, or about 36,000,000 lb. annually. The value would be about 2½ million sterling.

About 100 years ago the West Indies produced nearly all the cotton used in this country; later, cotton was discarded in favour of sugar and other crops yielding larger profits. Sugar now is not so profitable, hence the necessity for subsidiary industries. The recent revival of cotton planting is one of the results of the valuable services rendered to the West Indies by the Imperial Department of Agriculture.

Sea Island cotton was selected because the plant yielding it was formerly a native of the West Indies, hence it was peculiarly adapted to the conditions existing there. In 1903 the Imperial Commissioner, while on a visit to the United States, obtained £300 worth of cotton seed from one of the best estates in the Sea Islands, and thus was laid the foundation of an important new industry in the West Indies.

As showing the steady growth of cotton planting in this part of the world, it was stated that in 1902 the value of the lint and seed was just under £10,000; in 1903 it was nearly £12,000; in 1904 nearly £32,000, and in 1905 over £63,000. The returns for the year 1906 are not yet completed, but the value of the lint and seed produced during the quarter ending March 31 last was nearly £42,000, or two-thirds of that for the year 1905. The total value of the industry to date may therefore be placed at nearly £160,000.

There is still room for further development, provided the requirements of the market are closely studied, and exactly the right class of cotton is produced. The prices obtained have in some cases exceeded those paid for similar cotton grown in the Sea Islands. The highest prices, as for instance, at St. Vincent, have reached 20d. per lb. Barbados and Antigua come next with prices varying from 15d. to 19d. per lb. Excellent qualities of cotton have also been produced at St. Kitt's, Nevis, and Montserrat.

It is fortunate that Sea Island cotton is so well suited to the circumstances of the smaller sugar islands, where a paying alternative industry had long been sought for. Cotton growing has not been taken up to any considerable extent as yet at Jamaica, British Guiana, Trinidad, and Dominica, as in these colonies other industries, such as fruit, rice, cacao, and limes, had already received considerable attention and probably, except in the case of Jamaica, they are better adapted for such industries than for cotton.

At St. Kitt's Sea Island cotton is being grown as a catch crop on sugar estates, and is yielding, according to recent returns, a net profit varying from £3 10s. to £6 per acre. In the other islands where cotton is successfully grown, the net

profit may vary from £5 to £10 and even £12 per acre, depending on the character of the soil, and the skill and attention devoted to the cultivation.

It was stated that there were promising openings for young men of the right stamp, with a capital, say, of £1,500 to £3,000, to embark in the new cotton cultivation in the West Indies. It was advised that prospective settlers should go out during the winter months and thoroughly study the conditions beforehand. A fair amount of land was reported to be available at Antigua, Montserrat, and Nevis; and possibly also at St. Vincent, at prices ranging from £2 to £7 per acre; in a few instances land might possibly be rented at about 8s. to 12s. per acre. Men new to the tropics were advised to attach themselves, for one season at all events, to a good cotton plantation in order to become practically acquainted with the details of the cultivation before starting on their own account.

In conclusion, Sir Daniel Morris mentioned that the prospects of growing Sea Island cotton in the West Indies were distinctly promising. The demand for this class of cotton, on the basis of about 1s. per lb., was increasing everywhere. The climate and conditions in the West Indies exactly suited the plant, and there was an intelligent class of planters with an adequate labour supply to carry on the cultivation on a moderately large scale, say, up to 20,000 bales, at probably a lower cost than in the Sea Islands. There was also the advantage that, with a cotton crop, which was an annual one, the first returns began to come in within six months from the time of planting. It was believed that no other part of the world could produce Sea Island cotton so advantageously as the West Indies. It might be regarded as looking too far ahead, but it was the opinion of responsible persons closely connected with the industry that eventually the West Indies might produce all the best qualities of Sea Island cotton required outside the United States of America and thus add nearly a million sterling to the value of their present exports.

The valuable services rendered by the British Cotton-growing Association and by its President (Sir Alfred L. Jones) were warmly eulogized, as also the considerable interest taken in recent years in cotton and other subsidiary industries by the West India Committee.

FEEDING COTTON SEED MEAL TO SWINE.

Whenever cotton seed in any quantity has been fed to swine, the results have always been more or less unsatisfactory. There have been various theories advanced to explain the injurious ingredient of the cotton seed meal and how to overcome it, but, so far, there have been no methods advanced whereby large quantities of cotton seed meal may be fed to swine with safety.

To investigate whether souring cotton seed meal before feeding rendered it less injurious to swine, experiments were undertaken by the Agricultural Experiment Station of Wisconsin. From these trials there is no encouragement for the farmer, under our present knowledge, to feed cotton seed meal to swine. While it is used quite generally for dairy cows, and, in certain localities, is fed in large quantities to fattening cattle, it may prove fatal to swine when fed even in relatively small quantities.

EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming, should be addressed to the Commissioner, Imperial Department of Agriculture, Barbados.

All applications for copies of the 'Agricultural News' should be addressed to the Agents, and not to the Department.

Local Agents: Messrs. Bowen & Sons, Bridgetown, Barbados. *London Agents:* Messrs. Dulau & Co., 37, Soho Square, W., and The West India Committee, 15, Seething Lane, E.C. A complete list of Agents will be found on page 3 of the cover.

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Agricultural News

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NOTES AND COMMENTS.

Contents of Present Issue.

The editorial in this issue deals with the subject of the 'Improvement of Cotton by Seed Selection.' The work done in this connexion in the West Indies during the past season is briefly reviewed.

A memorandum by Dr. Watts on sugar-cane diseases in Antigua is published on pp. 242-3.

Mr. A. J. Brooks has forwarded an interesting account of incubator trials at the Dominica Agricultural School. (See p. 245.)

The Imperial Commissioner of Agriculture delivered a lecture, under the auspices of the West India Committee, in London, on July 19, on the Sea Island Cotton Industry in the West Indies. A summary of Sir Daniel Morris' lecture appears on p. 247.

Mention is made on p. 250 of young cotton plants being attacked by the root borer of the sugar-cane.

The general reports of the examiner on the recent examinations of the pupils of the St. Vincent and St. Lucia Agricultural Schools are published on p. 253.

On p. 254 will be found an interesting account of experiments conducted in India in connexion with the preservation of bamboos for industrial purposes. It is shown that, when bamboos are submitted to a series of soakings in copper sulphate and crude petroleum, their durability is much increased, and when used as telegraph posts they are capable of withstanding the attacks of borers.

Donkey Stallion for St. Vincent.

A donkey stallion, 'Bill Rice,' has been obtained by the Imperial Department of Agriculture from the United States for the stock farm at St. Vincent.

'Bill Rice' is a fine five-year-old donkey, measuring 61 inches from the centre of shoulder to the ground. He was safely landed *ex* S.S. 'Korona' on August 4 in Barbados, where he will be kept for some little time before being sent on to St. Vincent.

Seedling Sugar-canes in St. Lucia.

The annual report of the Agricultural Instructor in St. Lucia contains interesting information on the cultivation of seedling canes in that island. Plots of B. 208 and D. 95 were established at the five principal sugar estates for the purpose of testing these seedlings in comparison with the Bourbon. The experience gained is 'entirely in favour of B. 208, while D. 95 does not seem to be appreciated.'

The results show that B. 208 has given good yields of cane, its juice being rich in sucrose; it has also proved resistant to disease. Mr. Hudson lays stress on another point in favour of this seedling, viz., that, by reason of its vigorous growth and copious foliage, it covers the ground early and thus diminishes the amount of labour required for weeding. This is an important consideration on large estates where labour is scarce. There will be a large increase this year in the area devoted to B. 208.

B. 147 also appears to be giving good results in St. Lucia.

Desiccated Cocoa-nuts.

An interesting discussion took place at a meeting of the Royal Agricultural and Commercial Society of British Guiana, held on July 12, on the possibility of establishing a minor industry in desiccated cocoa-nuts. It may be mentioned that in England and the United States cocoa-nuts are cut up and desiccated for confectionery purposes. It was reported that the demand for this product is increasing.

At the meeting referred to, the Hon. B. Howell Jones stated that he had received a letter from a firm of mechanical engineers in England to the effect that they were prepared to send out a representative to initiate the establishment of such an industry if the matter met with sufficient response from those interested. The necessary plant for dealing with 750,000 nuts a year, exclusive of the cost of a 10-h.p. engine and boiler, and the building of a house, would cost £260.

Mr. Howell Jones suggested that, as few growers produced as many as 750,000 nuts a year, the growers should combine and erect a small factory. It would be necessary, however, that steps should be taken, by careful selection of nuts for planting and attention to cultivation, to improve the quality of the nuts produced in the colony, which, at present, compared very unfavourably with the quality of the product from the Straits Settlements, Trinidad, and Jamaica.

The Value of Agricultural Instruction.

In a recent report to the Jamaica Agricultural Society, one of the local Agricultural Instructors refers to the increased attention being paid to the subject of school gardens. Both teachers and scholars appeared anxious to have good gardens. This was particularly noticeable in the case of teachers who had attended the annual courses of agricultural instruction. 'One was constantly meeting cases where real practical good had been derived from these courses . . . and there were instances where the influence for good was spreading far beyond the school, and was gradually having a good effect on the whole district.'

He also referred to the advantage derived from the fact that many of these teachers were secretaries of the local branches of the Agricultural Society.

Exports of Martinique.

The *Consular Report* on the trade of Martinique for the year 1905 shows that the total value of the exports from the island amounted, during the year under review, to £725,460, as against £616,788 in 1904, an increase of £198,409. Nearly all the products of the island shared in this increase.

The principal product of Martinique is sugar, of which 30,186 tons, of the value of £466,101, were exported. The exports of rum amounted to 2,014,338 gallons (valued at £136,647).

The output of coffee rose from 3,298 lb. in 1904 to 27,484 lb. in the year under review; that of cacao from 6,264 cwt. to 9,225 cwt.

The other exports of Martinique are hides, cassia, logwood, vanilla, and musk seed.

Agriculture in Porto Rico.

The *Consular Report* on the trade of Porto Rico for the year 1905 contains interesting references to the agriculture of the island, which appears to be in a very healthy state.

Great advance is being made in the sugar industry, which is attracting capital. The value of the crop shows an advance of £743,161 on the previous year.

It is stated that the conditions are so favourable for the citrus industry that the grower may expect to enjoy a profit of £40 per acre by the end of the fifth year from planting.

There are about 6,000 acres devoted to cotton planting, but this area is not likely to be increased. Tobacco was exported from the island to the value of £659,620. Considerable improvement is noted both in the quality and quantity, and further attention has been paid to the cultivation of superior wrapper tobacco under shade.

The coffee industry showed little or no improvement on the past year's conditions of depression. Pine-apple growing, both for export whole and for canning, is increasing in favour. It is estimated that 4,000,000 plants were set out during the year. Pine-apples are largely planted in the orange groves.

Rubber Planting in Trinidad.

It would appear from the Annual Report of the Botanical Department that much interest is being taken in rubber planting in Trinidad. The various kinds of rubber plants are reported to have been in constant demand at the nurseries; 11,876 rubber plants were distributed during the year. The supply of Hevea seed and plants is unequal to the demand, but, as many of the trees are commencing to bear, this difficulty will soon be disposed of. The possession of fruiting trees of West African rubber (*Funtumia elastica*) added largely to the income derived from the sale of plants and seeds.

Of Castilloa rubber Mr. Hart says:—

'Several plantations, of over 20,000 trees each, now exist. On most estates the growth is excellent, one which was recently visited being able to show trees, six and a half years old, having a diameter of 12 inches at 3 feet from the ground. These trees are sufficiently mature to give good rubber, as was proved by trial bleedings, but it is doubtful if it would prove true economy to bleed at so early an age. On another estate where there are trees over twenty years of age, excellent rubber was produced.'

Funtumia elastica has shown its suitability for cultivation in Trinidad. 'It yields excellent rubber at six years old, which is more easily prepared than any other kind. The seeds grow freely, and young plants stand considerable hardship.'

West Indian Bulletin.

The second number of the *West Indian Bulletin*, (Vol. VII), issued to-day, contains several papers of general interest to West Indian agriculturists.

First comes a review of the efforts of the Imperial Department of Agriculture for the West Indies, contained in a letter addressed by Sir Daniel Morris, K.C.M.G., D.Sc., etc., to the Secretary of State for the Colonies, forwarding a report on the Department, which has been published as Colonial Reports—Miscellaneous, No. 36.

Next comes a technical paper by Dr. Watts and Mr. H. A. Tempany on the 'Polarimetric Determination of Sucrose' (Part II). This is a continuation of the previous paper published in the *West Indian Bulletin* (Vol. VI, pp. 52-60).

A report by Mr. Charles Allan, B.Sc., Fermentation Chemist in Jamaica, on the manufacture of Jamaica rum, reviews the methods at present in vogue for manufacturing 'common clean' rum and the high-flavoured rum known as 'German rum.' Mr. Allan shows that these methods are of a haphazard, rule-of-thumb nature, and should be replaced by a standardized method with a view to ensuring uniformity of quality with the minimum waste of materials.

A very interesting paper by Mr. Thomas Thornton, A.R.C.S., on the 'Improvement of Cotton by Seed Selection,' is reviewed in the editorial to this issue. Cotton growers will also find useful matter in a paper on the manuring of cotton.

The other subjects dealt with are the 'Canning of Pine-apples' and the 'Production of Camphor.'



INSECT NOTES.

Black Blight on Cacao in Grenada.

Readers of the *Agricultural News* are probably well aware of the relationship existing between the fungoid growth known as 'black blight' and scale insects—that the former finds suitable conditions for growth in the excretions of the scale insects.

Black blight has for some time been very prevalent in Grenada, but, as stated in the *Agricultural News* (Vol IV, p. 394) 'scale insects rarely attack cacao and nutmegs, although cases are known in Grenada of such attacks, and wild and uncultivated plants are frequently attacked and furnish a source from which the infestation may spread to cultivated plants of certain kinds.'

Such an attack has recently occurred on an estate in Grenada, where the scales and black blight have spread to the cacao from neighbouring bread-fruit and mango trees. The scale insects were found, with the black blight, on the cacao leaves just as on the ordinary trees, which can be seen all over the island.

On the advice of the Agricultural Instructor, the infested trees have been promptly dealt with. They have been entirely stripped of leaves, lime washed, and sprayed. It is very desirable that cacao planters should keep a careful watch on their trees for similar attacks, which must be dealt with promptly.

Cotton attacked by the Root Borer of the Sugar-cane.

In some of the fields of young cotton in Barbados there is evidence that the root borer of the sugar-cane has now added the cotton plant to the list of those which are subject to its attack. Here and there in the fields the leaves of the young plants have been seen wilting, and on being taken up, such plants have always been found with their roots damaged by a grub.

At first the damage was attributed to the cut worm, but it was found that the roots were being cut some way below the ground, not at the surface as is the case with the cut worm.

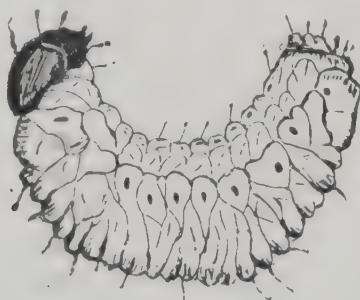


FIG. 15. GRUB OF THE ROOT BORER OF THE SUGAR-CANE.

In this case the pest has been recognized by the Rev. N. B. Watson as the root borer of the sugar-cane (*Diaprepes abbreviatus*). Fig. 15 shows the grub, where it is

seen from the side, magnified about twice. A full description of this pest will be found in the *West Indian Bulletin* (Vol. IV, pp. 37-47).

As all the damage done by these grubs is below the surface of the ground, it is somewhat difficult to deal with the pest.

Poisoned bait has been applied in infested fields, buried 2 or 3 inches below the surface and near the roots. The grubs appear to have been destroyed.

Another way of dealing with the pest is to dig up the grubs. This was done on one estate where there was a bad attack. No difficulty was experienced in finding the grubs when the soil was turned up from around the roots of plants just commencing to wilt, though it is impossible to find them when the plants are dead.

The poisoned bait is the same as that used to destroy the cut worms, and is made by mixing 1 lb. of Paris green and 30 lb. of pollard with molasses and water.

So far, the pest has not given any serious trouble, and no difficulty has been experienced in getting a good stand of young cotton in the fields in which it appeared. It will be well, however, for planters to be on their guard against the root borer.

HURRICANE INSURANCE IN THE WEST INDIES.

Tropical Life, for June, has the following:—

The Financial and Commercial Supplement to *The Times* of June 11 opened with an article, some two columns in length, on the West Indian scheme for insuring against hurricanes and storms.

Arrangements have been made to enable the scope of the scheme to extend to most of the British and French Islands which are subject to cyclonic storms. . . .

The most dangerous months are considered to be August and September. During this period the cane fields are not liable to such serious damage as later in the year, though in the French Islands, where the canes are planted earlier, they suffer more. For buildings on the sugar estates, a premium of 1 per cent. is suggested by Messrs. Henry Head & Co., Limited, who have worked out the scheme. This, however, is considered somewhat high.

With cacao and limes, it is proposed to value them, in case of damage, at 5s. a tree. On estates, as in Jamaica, where bananas are planted between the cacao, these, when damaged, will have to be paid for at a rate to be agreed on later. With cocoa-nuts no fixed premium or scale of compensation has been fixed upon as yet, but there should be no difficulty in arriving at a satisfactory understanding on these points. Coffee is on a somewhat different footing. Owing to the great difference between the yield of the trees, the difficulty of assessing the damage would be very great. With cotton it would be impossible to insure the crop for twelve months, like other products. On the suggestion of Dr. Francis Watts, it is proposed to insure cotton during the hurricane months alone, and, in the event of the plants being damaged by a hurricane, to pay the planter a fixed sum per acre, by way of compensation. Orange growers, it is thought, are not likely to insure, though possibly some of *Tropical Life's* friends will disagree with this statement. Arrowroot is not subject to serious damage, whilst rubber in the West Indies has not yet been grown extensively enough to trouble about, though, no doubt, later on it could be assessed at per tree, the same as cacao.

INTRODUCTION OF TROPICAL PLANTS INTO THE UNITED STATES.

In the Annual Report of the Bureau of Plant Industry of the U. S. Department of Agriculture, the following account is given of the experimental work done in the subtropical laboratory, under Professor P. H. Rolfs, in connexion with the introduction of tropical plants:—

Indian mangos.—A large number of varieties of Indian mangos are growing in the laboratory grounds. These are being pushed in growth as rapidly as practicable. In 1901 a small inarched tree of the General Gordon mango was received, buds from which were placed into large stock, which matured a crop of fruit in 1904. This reduced the time for securing test fruits to less than half that ordinarily required.

Manila hemp.—Manila hemp (*Musa textilis*), which has been growing in the laboratory grounds for nearly two years, has proved itself to be very vigorous, and it is probable that the variety on hand is hardy enough to produce an excellent fibre throughout the subtropical regions where bananas are cultivated.

Cassava.—The thirty-one varieties of cassava, which were introduced by the Office of Seed and Plant Introduction and Distribution, have been grown, and rigid selections have been made from them. The inferior varieties are being discarded, and the twelve best are continued. Some of these are exceedingly vigorous and produce an enormous crop of starch. Other investigations are being conducted on this crop, which, when completed, will make it possible for every grower to preserve his product throughout the year.

Anonas.—Mr. P. J. Wester, gardener of the Subtropical Laboratory, has succeeded in working out the necessary requirements for budding the sugar apple (*Anona squamosa*) and cherimoya (*Anona Cherimolia*) on the native pond apple (*Anona glabra*). The pond apple grows vigorously throughout regions where frosts are of frequent occurrence, while the other two species are too tender. This stock should impart a greater hardiness to the scion, making it possible to grow these delicious tropical fruits in regions farther north than the present limits. The pond apple, being a much more vigorous grower than these other anonas, will add vigour to the buds.

Vanilla beans.—During the past year the laboratory has been conducting experiments on the growing and maturing of vanilla beans, from which the true vanilla extract is produced. A sufficient crop was matured to enable us to carry the product through the fermentation process and produce the article in a commercial condition. This proved to be of superior quality.

Avocados.—The budding methods of the avocado have made it possible to make selections from the best of those growing in subtropical regions. Four of these have been budded and distributed to various correspondents, together with instructions as to methods of propagation, so that they may be readily propagated and distributed in a commercial way by the cultivators of this salad fruit. From our distribution it will be possible to have ripe avocados continuously from the earlier part of July to the first of January. Under the former method of growing these from seedlings, it was impossible to know beforehand what the quality of the avocado fruit would be, or the date of ripening.

Citrus hybrids.—The citrus hybrids, which are being grown for the Laboratory of Plant Breeding, have received considerable attention during the year. All which are sufficiently vigorous to permit buds to be taken have been budded into rough lemon stock. A large number of the

seedling hybrids have come into bearing. As soon as the fruits of those have been tested, the trees can be either discarded, or their propagation extended.

Pine-apple hybrids.—The pine-apple hybrids, which include 312 distinct crosses, are now in their third generation. Rigid selection and culling are going on. Some of the numbers are of very superior quality for eating. These are now sufficiently old to make it possible to judge of their stability and vigour of growth in the field, and their probable shipping qualities. Selections will now be made with two objects in view: (1) shipping to northern markets as a table fruit, and (2) canning.

SCIENCE NOTES.

Physic Nut.

The *Pharmaceutical Journal*, of June 30, has a note on 'Some Brazilian Drugs.' The following reference is made to the oil of physic nut (*Jatropha Curcas*). This plant, which belongs to the natural order *Euphorbiaceae*, is very common in the West Indies, where the medicinal value of its seeds are well known:—

This plant is widely distributed and cultivated in the hot and temperate parts of Brazil. The kernels of the ripe seeds yield by cold pressure 22 per cent. of colourless, odourless fixed oil, the taste of which resembles that of castor oil; by hot pressure 40 per cent. may be obtained, and by petroleum spirit 44 per cent., but in the latter case the oil has an acrid taste, due to a little resin which is simultaneously extracted. The seeds, free from their cotyledons, or slightly roasted to remove the poisonous principle, curcin, are employed in doses of two to five seeds as a purgative. The oil has no vesicating properties like croton oil.

The Mangosteen.

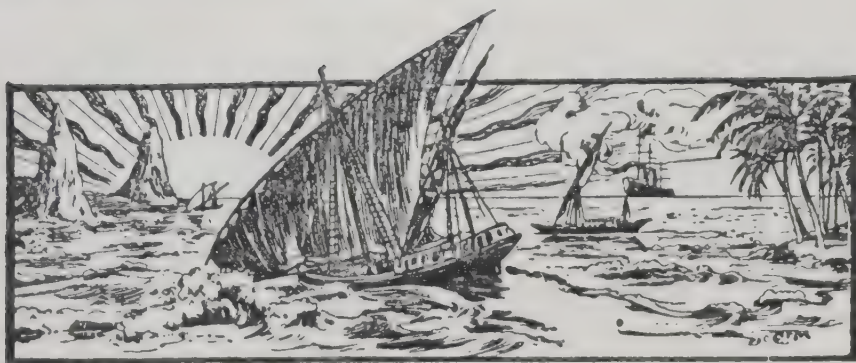
Short notes on this delicious fruit (*Garcinia Mangostana*) have appeared in the *Agricultural News* (Vols. II, p. 36, and IV, p. 164). Its cultivation is dealt with in a recent issue of the *Madras Mail*, and this information may be summarized as follows:—

The seeds, which germinate ordinarily in about a fortnight, should be sown 1 foot apart in nursery beds. Throughout one year, while the seedlings remain in the nursery, the beds should be watered daily. Well-grown seedlings would be at least 1 foot in height at the close of the year. They should then be planted out in well-prepared holes at distances of 20 feet. For one year after being planted out, the young plants should be provided with light shade. The plants should be copiously watered for at least two years.

The mangosteen plant has been known to bear fruit in the fifth year from planting out. At this age it has usually attained a height of 10 feet and a basal girth of 1 foot. The number, size, shape, and flavour of the fruit are improved with advancing years. A healthy plant in its tenth year is capable of yielding from 200 to 300 mangosteens.

The species is well adapted for cultivation in all localities with heavy rainfall, a loamy soil, and enjoying freedom from frost. The soil should be moist and well drained.

Specimens of *Garcinia Mangostana* are to be seen in most of the West Indian Botanic Stations.



GLEANINGS.

A large number of banana suckers are being obtained by the West Indian Fruit Company from Jamaica for planting in Trinidad.

Nearly 100,000 cwt. of lemons (value £400,000) are imported annually into the United Kingdom, chiefly from Spain and Italy. (*Atlas of the World's Commerce.*)

Pine-apple canning factories are working successfully in two parts of the island of Porto Rico, and more will be erected as soon as a good supply of fruit is assured. (*Consular Report.*)

In St. Lucia sugar-cane cultivation has received an impetus during the year 1905-6; improved machinery, to the value of £10,000, was imported, while four small abandoned muscovado estates re-started work.

Lieut.-Colonel D. Prain, F.R.S., Director of the Royal Gardens, Kew, and late Director of the Botanical Survey of India, has been appointed a Companion of the Order of the Indian Empire (C.I.E.).

The fifth Agricultural Show for the county of Demerara will be held, under the auspices of the Board of Agriculture, at the Promenade Gardens on September 12 and 13. There will be special prizes for school garden exhibits.

We hear that a large amount of goat manure has been imported into Trinidad during the past month, and sold to cacao proprietors and others. The manure is imported chiefly from Margarita. (*Port-of-Spain Gazette.*)

No steps have yet been taken to conserve the vanilla industry at Tahiti, and as a consequence, the price of this product has further fallen from 1s. 0 $\frac{3}{4}$ d. per lb. in 1904 to 10 $\frac{1}{2}$ d. per lb. in 1905. (*Consular Report.*)

According to the *Textile Mercury*, Sea Island cotton is now being exported from French Oceania. A 220lb.-lot of Tahiti Sea Island cotton sold at \$46.71, or at the rate of a little over 21c. per lb.

According to the report of the United States Secretary of Agriculture, 'distillations from Florida camphor plantations have given a good yield of crude gum camphor. The production of camphor on a commercial scale will be tested in the near future.'

According to the *Demerara Argosy*, an impetus has been given to rice growing in Leguan by the estates' proprietors making small advances on the crops. 'With favourable rains excellent returns are expected. Rice promises to be the salvation of Leguan.'

The *Dominica Guardian* says of the Agricultural School: 'We wish the school continued success. There is no doubt of the good work which the institution has already done and is still doing.'

The first issue of the resuscitated quarterly review, *Science Progress*, has been received. This publication is edited, with the assistance of a strong advisory committee, by Dr. N. H. Alcock and Mr W. G. Freeman.

During the quarter ended June 30, 4,080,619 cocoa-nuts, of the value of £12,757, were exported from Trinidad; in the corresponding period of last year the exports were 2,235,149. Of copra 670,548 lb., of the value of £4,750, were exported, and 7,876 gallons of cocoa-nut oil.

The *Cotton Trade Journal*, of Savannah, U.S.A., refers to the unfavourable outlook for the Sea Island cotton crop, 'which indicates a materially reduced crop from the present season. At this time the outlook for the satisfactory development of the crop is not assuring.'

In reference to the note in the *Agricultural News* (Vol. V, p. 232) on the sale of peppers from Nevis, it may be of interest to mention that preparations are being made for trying an acre of Nepaul peppers in three different places in Nevis, with a view to determining to what extent they might take a place among the minor industries of the island.

According to the *Queensland Agricultural Journal*, 'all over the state small and large areas are being prepared for sisal planting, and the demand for plants far exceeds the supply. Those who have been early in the field, and whose plants are now throwing out suckers, will be enabled to sell them at a good price.'

Mr. C. H. Knowles, Superintendent of Agriculture, Fiji, writes that a small ginnyery, containing one gin worked by water power, will shortly be erected. 'The building will be arranged after the model of the St. Vincent factory, with the gin on a concrete foundation, rising through the first floor, the motor being below.'

As showing the great difference in size between the eggs laid by local breeds of fowls and those from thorough-bred imported birds, it may be of interest to mention that it was found in the trials conducted at the Dominica Agricultural School (see p. 245), that an incubator of 120-egg capacity was capable of holding 150 to 160 eggs of the local birds at each filling.

According to the *Consular Report* on the trade of Caracas, the prosperity of Venezuela is wholly dependent on the price of coffee. The only other product of any importance is cacao. Alternative industries are seriously needed. The total exports of coffee from La Guayra in 1905 were only 4,015 metric tons, as against 11,018 metric tons in the previous year.

According to the *Bulletin of the Agricultural Department*, Bahamas, samples of mangrove bark were recently sent to England and America for reports as to their commercial value. The report received from England was to the effect that the samples contained much less tanning matter than the East Indian mangrove, and lost in value through being extremely red in colour. It was not thought it would pay to export the bark, although it would be a useful tanning material on the spot.

AGRICULTURAL SCHOOLS.

St. Vincent.

The following is the general report of the examiner (Mr. F. A. Stockdale, B.A.) on the recent half-yearly examination of the pupils of the St. Vincent Agricultural School :—

Only one boy took the papers set for the senior class, and, on the whole, the answers were satisfactory. In Agriculture he showed that he possessed a good knowledge of the pests and diseases that attack cotton in St. Vincent, but the Chemistry paper seemed to indicate that the preparation and use of the principal insecticides and fungicides were imperfectly known. On the whole, much better results would have been obtained if the facts set down in the various answers had been more carefully and thoughtfully arranged.

Twenty-one boys took the junior papers, and considerable improvement has been made by some of the boys since the last examination. Twelve boys obtained over 50 per cent. of the total marks.

McConnie maintained his position as head of the juniors, with over 70 per cent. of the total marks. The work of the next five boys is very uniform, and they occupy the same order as in the last examination, with about 65 per cent. of the total marks. If it is thought that they are sufficiently advanced, they might be promoted to the senior class: more attention could then be given to the weakest boys in the school. The work, on the whole, is fairly satisfactory, and of the more important subjects Arithmetic is again the best; the working, with few exceptions, being neat and clear. There is, however, a tendency to cramp it into a very narrow margin and therefore the results frequently get confused. Dictation and composition produced some satisfactory papers, but in the latter subject the boys do not carefully arrange their facts, and are inclined to be much too verbose. Botany and Agriculture were uniform and of a fair standard, but Geography and Chemistry are still weak. In Geography the drawing of maps might receive continued attention, for some of the boys are inclined to be rather untidy. Further attention should be given to Chemistry, for, although slight improvement has been made since the last examination, the boys knew very little about the preparation and uses of Bordeaux mixture. It might be advisable if the preparation of the more important fungicides and insecticides were performed and their uses and actions explained, while being used practically in the grounds attached to the school.

St. Lucia.

Mr. Stockdale's report on the St. Lucia Agricultural School is as follows:—

Eight boys took the papers set for the senior class and there were ten juniors.

Of the eight seniors the work of DuBoulay was very satisfactory, for he obtained 75 per cent. of the total marks. His work is inclined to be rather careless and untidy, and many more marks would have been obtained if more style had been shown. Five of the remaining seven obtained over 50 per cent. of the total marks, but most of them found the questions too hard for them. It is to be regretted that an error was made in allowing these boys to take papers which were intended for DuBoulay alone, and I should now suggest that Girard, Lawrence, and Alexander continue with the senior course, if it is considered that they have had sufficient

grounding in the elementary work, and the remaining four boys confine their attention to the work prescribed for juniors. Gabriel and Katty again occupy the lowest position, and should receive attention, so that some improvement may be shown in the next examination. In Agriculture, marked improvement has been made, for a good elementary knowledge was shown of the cacao tree, and the questions that touched upon the experimental work in the field clearly showed that the boys take an interest in their practical work. Some of the boys sent in some good answers in Chemistry, but most of them spent too much time over the first question, with the result that the remainder were somewhat scamped. The Botany, on the whole, was poor, as most of the boys seemed to lack powers of observing for themselves. More attention should be given to this subject and also to map-drawing in Geography. The Arithmetic was the best of the more important subjects, some of the boys sending in neat papers with accurate results.

Of the ten juniors only one obtained over 50 per cent. Some of the papers on Botany and Agriculture were fair, but the knowledge of the science subjects is rather superficial. This is only to be expected when it is remembered that these boys have all been at the school for less than a year. The Geography and Arithmetic might have been much better. In the former subject, map-drawing should receive attention, and in the latter the neatness of the papers should be improved. In some cases the spelling of the boys is weak, but the writing has improved since the last examination.

MANUFACTURE OF BROOMS FROM BROOM CORN AT ANTIGUA.

The *Antigua Standard*, of July 21, reports that Dr. Watts' invitation to inspect the Experiment Station at Skerrett's was well responded to by members of the Agricultural and Commercial Society on July 13. The following reference is made, in the report on this visit, to the manufacture of brooms from broom corn, and the possibility of establishing a new minor industry:—

At the station Dr. Watts exhibited a number of brooms made from the broom corn, which was growing there on the occasion of the members' last visit. He explained that classes of instruction in broom making had been arranged at the Botanic Station, where an effort was made to teach young men an art, which could be usefully followed in their leisure hours and result in satisfactory additions to their earnings. He regretted that those classes had not been taken such full advantage of as he had hoped, but further classes would be arranged on receipt of the names of a sufficient number of persons desiring instruction. All the materials for making the brooms would be supplied by the station, and instruction was free. The brooms were worth about 9d. each, and one could be made in less than an hour. We examined them, and except perhaps in the matter of a few finishing touches of paint, etc., they are quite as good as the imported American article sold here, paying freight, duty, etc., at 1s. 4d. each. There is in this a possible industry, if it can be developed and a demand created; and as Dr. Watts suggested, possibly one of our merchants might be induced to stock them.

Efforts are also being made in Montserrat to encourage the cultivation of broom corn for the manufacture of brooms. It is possible that, in addition to supplying the local demand for these brooms, broom corn might be profitably exported to Canada, which at present imports this material from the United States.

DURABILITY OF BAMBOOS.

In reference to a note in the *Agricultural News* (Vol. V, p. 36) on the above subject, Mr. C. S. Rogers, Forest Officer in Trinidad, has forwarded the following interesting extract from the *Indian Forester*, the journal of the Indian Forest Department, dealing with this question:—

A series of experiments and observations was conducted at the Indian Museum, Calcutta, throughout the greater part of the year 1903 with a view to ascertaining whether it was possible, by impregnating or soaking the bamboo with some preservative material, to protect it from the shot borer's attacks. . . .

The bamboos experimented with were from a lot received at the Government telegraph workshops in Calcutta from Northern India. They had been cut in the cold weather of 1902-3. As already explained in the previous note, these bamboos were to be converted into field telegraph posts, and in the hope of giving them some protection against the shot borer pest, they were subjected to a series of soakings in water, copper sulphate, and Rangoon oil (the crude petroleum of Burma, C.S.R.). For over eight months untreated bamboos and those treated with one or more of the above solutions were kept under close observation, all the lengths experimented with having been received direct from the workshops, chosen at haphazard by the Superintendent.

As a result of the careful observations throughout this period, it was proved that the untreated bamboos were invariably attacked by the shot borer (*Dinoderus minutus*), within a couple of months, i.e., between March and May; that soaking in water alone or followed by emersion in the copper sulphate solution was equally innocuous to the beetles; but that those bamboos, which had proceeded the further stage and had been soaked in Rangoon oil, were immune from subsequent attack by the pest. It was shown that the insect passes through no less than five generations in the year, different swarms of the adult individuals appearing in April, June, July, September, and October, and that the attacks of one or more of these generations with those of their resultant grubs would ordinarily have reduced the bamboos, if untreated, to powder; it was therefore held to have been proved, as a result of the experiments, that the life of the bamboo had lengthened by at least a year as a direct result of the impregnation.

It has since been possible to trace the history of these treated bamboos, all of which were converted into field telegraph posts, a further stage in their career; and the evidence that has been obtained both by the use of the posts in the field, and, equally important, by their storage in an open shed without any special protection being afforded to them in the workshop yard, points to the wonderful efficacy of the oil treatment. It is the purpose of this supplementary note to give publicity to this fact, firstly, owing to numerous inquiries as to the necessary treatment to be given to bamboos having been received from the Public Works Department; and, secondly, because the oil treatment for the preservation of bamboos may be said to have now passed the rubicon of the experimental stage and to have reached the arena of practical utility.

To go back to the bamboos converted in 1903. Some of them were sent up that year for service with the Tibet Mission. They were returned to store in Calcutta about the beginning of the present year, and Mr. L. Truniger, C.I.E., who was in charge of the field telegraph with the Mission, has stated that they had fully answered expectations. Some of these returned posts were inspected by the writer in the

yard at Calcutta towards the end of March last. Although it was two and a half years since they were cut in the forest of Upper India and close upon two years since they were treated with the oil, they showed no trace of attacks by the *Dinoderus* beetle. It may be contended, and justly, that throughout 1904 these posts had been at an altitude greatly above that at which either of the shot borer beetles could, or do live, and that they were thus safe from their attacks. This was so, but the same argument does not hold good when we come to consider those converted bamboos which remained throughout the year in store in Calcutta. An inspection of these has shown that they have remained equally immune from the pest. Most are aware how short is the life, economically, of the bamboo after it has been cut, and many know the difficulties which stand in the path of the lance, the tent-pegging, and hog spear purveyor. The results that have attended the treatment of 9,000 bamboos in 1903, are well worthy of the consideration of these latter, for on present observations it has been shown that the impregnation with oil leaves the bamboo strong and serviceable two and a half years after it has been cut.

Arrangements have been made to keep some of these posts under continuous observation with the object of ascertaining the longevity to which the treatment enables them to attain.

That the Telegraph Department has the fullest confidence in a discovery, the full credit of which chiefly belongs to it, is borne out by the fact that an additional 30,000 bamboos are, at the time of writing, being put through the treatment and converted into field telegraph posts. It may be stated that the recommendations of the previous note are being followed, the bamboos being first soaked in water for five days (this is very necessary for reasons previously given), allowed to dry for several days, and then re-soaked in the Rangoon oil (crude petroleum), this latter, as used in the workshops, having the consistency of treacle.

AGRICULTURE IN ASHANTI.

The *Annual Report* on Ashanti for 1905 contains the following reference to agricultural operations in that district:—

Everything points to the fact that the Ashanti will, if encouraged, turn his attention to the cultivation of the soil for economic purposes. Numerous new cacao plantations were started during the year, mainly in the southern and eastern parts of Ashanti, and it is hoped that the high prices obtained in Kumasi will prove an incentive to the further cultivation of the plant.

The natives have not yet learnt to plant out young rubber or kola trees, but every endeavour has been made to induce them to do so. The number of kola trees in bearing increases automatically every year, and the young trees are watched over and well cared for by their owners, but systematic cultivation is desirable.

The area of land under cultivation with farm produce is increasing, and food is becoming more plentiful in consequence.

Both tobacco and rice (hill) are grown in Jaman territory, but, so far, only for local consumption. Cotton has not yet been attempted on any large scale in Ashanti, although efforts have been made to distribute seeds.

When the projected Botanical Station is established in Kumasi, a strong endeavour will be made to augment the cultivation and increase the production of the various agricultural commodities of Ashanti.

WEST INDIAN PRODUCTS.

Drugs and Spices in the London Market.

The following report on the London drug and spice market for the month of June has been received from Mr. J. R. Jackson, A.L.S. :—

The only article of West Indian produce about which any special interest attaches is Jamaica ginger, which, in the middle of the month, showed an advance in price for the superior qualities.

GINGER.

At the first spice auction on the 13th., as many as 385 packages of Jamaica were offered, 260 of which were sold, the better qualities realizing from 2s. to 3s. advance on previous quotations, and the lower qualities 1s. advance. The prices ranged from 57s. 6d. to 59s. per cwt., for good common, to 78s. to 80s. for good bold. Of Cochin and Calicut 460 packages were offered, and 300 sold without reserve at 28s. for medium and small rough, slightly wormy. A week later Jamaica ginger was represented by 380 packages, of which about 70 sold at 60s. to 61s. for small and lean dull washed; 67s. to 68s. for fair washed; and 63s. for small washed.

NUTMEGS AND MACE.

At the spice sale on the 13th. some 330 packages of West Indian nutmegs were offered, and 300 disposed of at steady rates. On the 27th. some 120 packages of West Indian were offered, realizing prices at from 1s. 2d. to 1s. 4d. per lb. for 65's, to 5½d. for 144's. Mace at the first sale met with a steady demand, 60 packages of West Indian realizing the following prices: for good pale, 1s. 9d.; fair pale, 1s. 5d. to 1s. 7d.; and ordinary, 1s. 3d. to 1s. 4d. At the last sale on the 27th. these prices had very slightly declined.

ARROWROOT.

At the first spice auction 163 barrels of St. Vincent were offered, and 93 sold at 1¾d. to 2d. per lb. for fair manufacturing. At the same sale 30 cases of good Natal were bought in at 3½d. per lb.

SARSAPARILLA.

At the first drug sale the prices asked for this drug were dearer all round. A bale of good Lima-Jamaica realized 2s. 2d. per lb.; 2 bales of coarse sold at 1s. 11d. Two bales of red native Jamaica realized 1s. 3d., and 1 bale of yellow, 1s. 2d. per lb. No grey was offered, and it was announced that there was still a great scarcity. A fortnight later these prices had advanced by 1d. to 2d. per lb.

TAMARINDS, LIME JUICE, AND CASHEW NUTS.

Of tamarinds, 47 bales were offered and disposed of at the third sale, realizing for fair new crop Antigua, in bond, 14s. to 14s. 6d. per cwt., one lot fetching 16s. At the last sale 6 barrels of Barbados were offered and disposed of at 14s. in bond. On the 20th., 9 puncheons of good pale raw West Indian lime juice were sold at from 1s. 1d. to 1s. 2d. per gallon; 7 puncheons of common brown were also sold without reserve at 4d. to 5d. At this sale 12 cases of cashew nuts (country not stated) fetched 34s. to 34s. 6d. per cwt.

CHILLIES.

For chillies lower prices prevailed; 200 bales of ordinary dark mixed Mombasa were offered without reserve, of which 20 bales only were sold at 16s. 6d. per cwt.

Canada.

Mr. J. Russell Murray, of Montreal, has forwarded the following report, dated July 20, on West Indian products in the Canadian markets :—

Business continues very dull. Sugar offerings from Demerara continue to be received, but no business has been transacted, buyers being fairly well stocked at present.

ORANGES.

Jamaica oranges have recently been arriving, but in very bad order. When will Jamaica planters make up their minds to handle fruit along the lines of the California and Florida growers? The greatest care in selecting, grading, and packing is of the utmost importance. A small shipment arrived here a few weeks ago with fully 40 per cent. of loss; such conditions can only prevent buyers from buying direct, and this will mean that when Jamaica fruit is wanted it will be purchased in New York or Boston repacked, which throws the trade out of intercolonial hands into those of the United States.

FORESTRY IN GRENADA.

An Ordinance has recently been passed in Grenada 'to protect and conserve the forests and water sources of the colony.' Amongst other provisions it constitutes a Board to be called 'The Forestry Board,' established for the purposes of exercising the powers conferred upon it under the provisions of this ordinance and of discharging such functions as the following :—

(a) Whilst ascertaining which portions of the Crown Lands or other estates in the colony should be declared to be and constituted, in the manner hereafter appearing, Rain or Forest Reserves, to determine upon and report to the Government what estates (if any) should be acquired for such purposes.

(b) To issue bulletins for the dissemination of sound instruction amongst planters, cultivators, and other inhabitants of the colony concerning forestry and the selection, planting, fostering, and felling of trees generally.

(c) To draft schemes for the protection of the forest growth of the colony and for securing the co-operation of landowners and others in acting as Forest Guards.

DEPARTMENT NEWS.

On Wednesday, July 4, the Imperial Commissioner of Agriculture for the West Indies addressed a meeting held under the auspices of the Liverpool Chamber of Commerce on the condition and prospects of cotton growing in the West Indies.

On July 19, Sir Daniel Morris delivered a lecture at the West India Committee Rooms on the 'Present Position and Prospects of the Sea Island Cotton Industry in the West Indies.' A summary of this lecture appears elsewhere in these columns.

The Hon. Francis Watts, C.M.G., D.Sc., Government Analytical Chemist and Superintendent of Agriculture for the Leeward Islands, having been granted leave of absence, left Antigua in S.S. 'Trinidad' on July 24, for New York *en route* for England. It is probable that Dr. Watts will return to the Leeward Islands about the middle of December next.

MARKET REPORTS.

London,—July 18, 1906. Messrs. KEARTON, PIPER & Co.; Messrs. E. A. DE PASS & Co. July 13; 'THE WEST INDIA COMMITTEE CIRCULAR' July 11; 'THE LIVERPOOL COTTON ASSOCIATION WEEKLY CIRCULAR,' July 13; and 'THE PUBLIC LEDGER,' July 7, 1906.

ALOE—Barbados, 15/- to 60/-; Curaçoa, 20/- to 55/- per cwt.
ARROWROOT—St. Vincent, 2d. per lb.
BALATA—Sheet, 1/4 to 1/11; block, 1/4 to 1/4½ per lb.
BEES' WAX—£8 5s. to £8 15s. per cwt.
CACAO—Trinidad, 57/- to 63/- per cwt.; Grenada, 50/- to 55/- per cwt.
CARDAMOMS—Mysore, 7½d. to 3/- per lb.
COFFEE—Jamaica, good ordinary, 39/- to 41/- per cwt.
COTTON—West Indian, medium fine, 6½d.; West Indian Sea Island, medium fine, 13½d.; fine, 14½d.; extra fine, 16d. per lb. Prices paid, 9d. to 15d. per lb.
FRUIT—
BANANAS—Jamaica, 4/6 to 6/- per bunch.
LIMES—4/- to 4/6 per box.
FUSTIC—£4 to £4 10s. per ton.
GINGER—Jamaica, 58/- to 65/- per cwt.
HONEY—Good bright liquid to white set, 21/- to 25/6; dark to fair liquid, 16/6 to 20/6 per cwt.
ISINGLASS—West Indian lump, 1/10 to 2/3; cake, 1/2 to 1/3 per lb.
KOLA NUTS—4d. to 6d. per lb.
LIME JUICE—Raw, 11d. to 1/3 per gallon; concentrated, £20 15s. per cask of 108 gallons; hand-pressed, 2/6 to 2/9 per lb. Distilled Oil, 2/6 per lb.
LOGWOOD—£4 to £4 15s.; roots, £3 10s. to £4 per ton.
MACE—Fair pale, 1/6; fair red, 1/4 to 1/5; broken, 1/- to 1/1 per lb.
NITRATE OF SODA—Agricultural, £11 12s. 6d. per ton.
NUTMEGS—80's, 10½d.; 95's, 7½d.; 110's, 6½d.; 130's, 6d. per lb.
PIMENTO—Fair, 2½d. to 2¾d. per lb.
RUM—Jamaica, 2/1; Demerara, 9½d. per proof gallon.
SUGAR—Yellow crystals, 14/6 to 15/- per cwt., Muscovado, 13/- to 14/6 per cwt.; Molasses, 10/- to 14/6 per cwt.
SULPHATE OF AMMONIA—£11 10s. to £11 12s. 6d. per ton.

Montreal,—July 20, 1906.—Mr. J. RUSSELL MURRAY
(In bond quotations, c. & f.)

COCOA-NUTS—Jamaica, \$26.50 to \$28.50; Trinidad, \$25.00 to \$26.00 per M.
COFFEE—Jamaica, medium, 10c. to 11c. per lb.
GINGER—Jamaica, unbleached, 14c. per lb.
MOLASCUIT—Demerara, \$1.00 per 100 lb.
MOLASSES—Barbados, 27c. to 28c.; Antigua, 22c. to 23c. per Imperial gallon.
NUTMEGS—Grenada, 110's, 18c. per lb.
PIMENTO—Jamaica, 6c. per lb.
SUGAR—Grey crystals, 96°, \$2.15 to \$2.20 per 100 lb.
—Muscovados, 89°, \$1.65 to \$1.80 per 100 lb.
—Molasses, 89°, \$1.45 to \$1.65 per 100 lb.
—Barbados, 89°, \$1.60 to \$1.85 per 100 lb.

New York,—July 20, 1906.—Messrs. GILLESPIE BROS. & Co.

CACAO—Caracas, 13c. to 13½c.; Grenada, 11¼c. to 11½c.; Trinidad, 11¼c. to 12c.; Jamaica, 11c. to 11½c. per lb.
COCOA-NUTS—Jamaica, \$22.00; Trinidad, \$23.00 per M.
COFFEE—Jamaica ordinary, 8c. to 8¼c.; good ordinary, 8¾c. per lb.
GINGER—Dark scraggy root, 10c. to 11½c.; white to bright bold, 11¾c. to 13½c. per lb.
GOAT SKINS—Barbados, Dominica, and Antigua, 58c.; Jamaica, 58c.; St. Kitt's, 51c. to 52c. per lb.
GRAPE FRUIT—Jamaica, \$5.00 to \$8.00 per barrel; \$3.00 to \$4.00 per box.

LIMES—\$5.50 to \$6.00 per barrel.
MACE—28c. to 31c. per lb.
NUTMEGS—West Indian, 80's, 21c. to 22c.; 90's, 17c. to 18c.; 110's, 14½c.; 130's, 12c. per lb.
ORANGES—Jamaica, \$4.00 to \$4.50 per barrel; \$2.00 to \$2.25 per box.
PIMENTO—4¾c. to 5½c. per lb.
SUGAR—Centrifugals, 96°, 3.61c. to 3.64c.; Muscovados, 89°, 3.11c. to 3.14c.; Molasses, 89°, 2.86c. to 2.89c. per lb., duty paid.

INTER-COLONIAL MARKETS.

Barbados,—August 4, 1906.—Messrs. T. S. GARRAWAY & Co., and Messrs. JAMES A. LYNCH & Co.,
July 31, 1906.

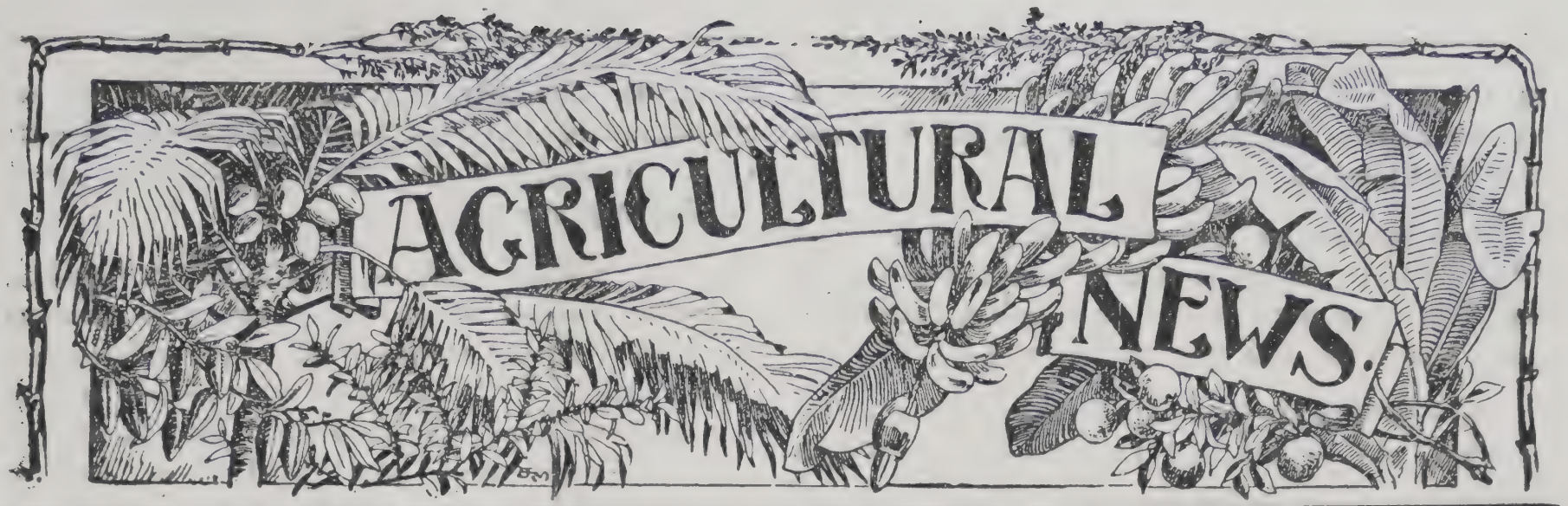
ARROWROOT—St. Vincent, \$4.00 to \$4.25 per 100 lb.
CACAO—\$10.50 to \$11.25 per 100 lb.
COCOA-NUTS—\$15.00 per M. for husked nuts.
COFFEE—\$10.50 to \$11.75 per 100 lb.
HAY—\$1.00 to \$1.10 per 100 lb.
MANURES—Nitrate of soda, \$60.00; Ohlendorff's dissolved guano, \$55.00; Cotton manure, \$48.00; Cacao manure, \$45.00; Sulphate of ammonia, \$75.00; Sulphate of potash, \$67.00 per ton.
ONIONS—Bermudas, \$2.50; Madeira, \$1.51 to \$2.00 per 100 lb.
POTATOS, ENGLISH—\$3.25 per 160 lb.; Nova Scotia, \$2.50 per 160 lb.
RICE—Ballam, \$5.45 to \$6.00 per bag (190 lb.); Patna, \$3.00 to \$3.40; Rangoon, \$2.75 to \$3.00 per 100 lb.
SUGAR—Muscovados, 89°, \$1.50 per 100 lb.

British Guiana,—July 28, 1906.—Messrs. WIETING & RICHTER.

ARROWROOT—St. Vincent, \$8.00 per barrel.
BALATA—Venezuela block, 25c.; Demerara sheet, 38c. per lb.
CACAO—Native, 12c. to 13c. per lb.
CASSAVA STARCH—\$3.50 per barrel.
COCOA-NUTS—\$10.00 to \$12.00 per M.
COFFEE—13¾c. to 14c. per lb.
DHAI—\$4.75 to \$4.90 per bag of 168 lb.
EDDOES—\$1.32 per barrel.
MOLASSES—15c. to 15½c. per gallon.
ONIONS—Tenerife, 2c.; Madeira, 2½c. per lb.
PLANTAINS—20c. to 40c. per bunch.
POTATOS, ENGLISH—2½c. per lb.
POTATOS, SWEET—Barbados, \$1.68 per bag.
RICE—Ballam, \$5.75 per 177 lb.; Creole, \$5.50 per bag; (ex store).
SPLIT PEAS—\$6.00 to \$6.15 per bag (210 lb.).
TANNIAS—\$2.04 per barrel.
YAMS—White, \$1.68; Buck, \$2.64 per bag.
SUGAR—Dark crystals, \$1.95 to \$2.10; Yellow, \$2.30 to \$2.50; White, \$3.25 to \$3.50; Molasses, \$1.40 to \$1.60 per 100 lb. (retail).
TIMBER—Greenheart, 32c. to 55c. per cubic foot.
WALLABA SHINGLES—\$3.00, \$3.75, and \$5.25 per M.

Trinidad,—July 28, 1906.—Messrs. GORDON, GRANT & Co.

CACAO—Ordinary, \$11.75; estates, \$12.25 per fanega (110 lb.); Venezuelan, \$12.75 to \$13.00 per fanega.
COCOA-NUTS—\$20.00 per M., f.o.b.
COCOA-NUT OIL—69c. per Imperial gallon (cask included).
COPRA—\$3.85 to \$4.05 per 100 lb.
DHAI—\$4.40 to \$4.50 per 2-bushel bag.
ONIONS—\$1.25 to \$2.00 per 100 lb. (retail).
POTATOS, ENGLISH—\$2.25 to \$2.30 per 100 lb.
RICE—Yellow, \$5.20 to \$5.50; White, \$5.00 to \$6.00 per bag.
SPLIT PEAS—\$5.50 to \$5.60 per bag.
SUGAR—Yellow crystals, \$2.00 to \$2.25; Molasses, \$1.50 to \$2.00 per 100 lb.



A FORTNIGHTLY REVIEW

OF THE

IMPERIAL DEPARTMENT OF AGRICULTURE FOR THE WEST INDIES.

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of the Government Experiment Station, Peradeniya, Ceylon.*

Although, perhaps, more attention has been paid in the West Indies to the Central American rubber tree (*Castilloa elastica*) and the West African (*Funtumia elastica*), the prospects of cultivating Para rubber have not been lost sight of. In the last Annual Report on the Botanical Department in Trinidad, Mr. Hart states that the supply of seeds and plants of *Hevea brasiliensis* had been unequal to the demand. The St. Lucia Agricultural Society is importing seed of this tree from Ceylon, while seed has also been imported by the Imperial Department of Agriculture for Dominica.

Important experiments have been conducted at Peradeniya in connexion with all phases of Para rubber cultivation. The area at present planted in this tree in Ceylon is estimated to be about 60,000 acres. Mr. Wright's experience in Ceylon, together with that obtained by others in the Straits Settlements, West Africa, and other places, is recorded in this book.

In regard to the question of shade for Para rubber, it would appear that the trees develop better if lightly shaded for the first two years after planting. After that they grow satisfactorily without shade. Wind-breaks are generally necessary only during the early stages of growth.

Drainage is as necessary for rubber trees as it is for any other plant. Attention should be paid to

* *Hevea brasiliensis* or Para Rubber: Its Botany, Cultivation, Chemistry, and Diseases. Colombo: Messrs. A. M. & J. Ferguson. 1906.

Cultivation of Para Rubber.

IN view of the interest that is being taken in the West Indies in the matter of the cultivation of rubber-yielding trees, it may be useful to review briefly a recent book on Para rubber by Mr. Herbert Wright, A.R.C.S., F.L.S., Controller

holing, as good holing will give the young plants a better start. The holes should be $1\frac{1}{2}$ feet deep and as wide as possible.

The Para rubber tree usually seeds freely after its fifth year, and mature trees may be expected to give some 500 seeds per annum. The seeds germinate in a few days, if the beds are regularly watered.

In regard to the important subject of the distance at which the trees should be planted, Mr. Wright discusses at some length the relative advantages of close and wide planting. Taking into consideration that the main object of persons who are planting this product is to obtain the quickest returns, he recommends a distance of 10 feet by 10 feet. This is, of course, on the assumption that all ideas of catch crops are disregarded. On such an estate individual trees could be tapped, as soon as they attained a diameter of 20 inches, on the full spiral system until they died, and thus make room for the further development of the remaining trees.

In the case of rubber trees planted close, the cultivation of inter-crops, or catch crops, is limited to about four to eight years. Cassava, bananas, cacao, coffee, chillies, ground nuts, lemon grass, pepper, gingelly, and perhaps tobacco and cotton, are suggested for cultivation under such conditions.

The cultivation of permanent inter-crops—such as cacao and coffee—would be confined to wide-planted estates, as the rapidly growing surface roots of Para rubber will ultimately take possession of the soil. In the West Indies cacao would be the crop most likely to be grown with the rubber. In many districts of Ceylon, the mixed cultivation of cacao and rubber is extending. In this connexion, Mr. Wright suggests that the cacao trees be planted 10 feet to 20 feet apart. Many are planting cacao and rubber both 20 feet apart, so that there will be, approximately, 100 rubber and 100 cacao trees to the acre.

Considerable space is naturally devoted in this book to the important subject of tapping. Bad tapping often results in permanent injury to the trees. In regard to tools, Mr. Wright states that 'the faultless or ideal paring implement has not yet been produced, though there seems every likelihood that it will soon be on the market.' The object must be to ensure that the minimum, if any, damage is done to the cambium. The first requisite of a good tapping knife is that the cutting surfaces shall be such as to enable the operator either to make an even, clean cut or to excise the cortical tissue without dragging the cells or clogging

the knife. Secondly, it should be capable of such adjustment as to prevent the operator from cutting too deep. Descriptions are given of the best known tapping implements.

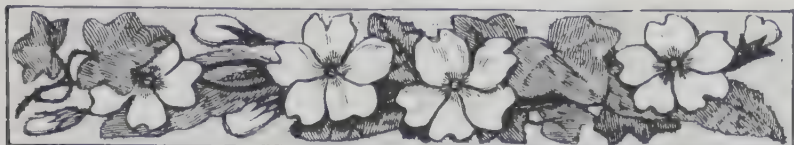
The various methods of tapping Para rubber trees are roughly described as (a) single oblique lines, (b) V-shaped incisions, (c) single oblique cuts, with a vertical channel joining them, the cuts being on one or both sides of the vertical line (known as the 'half-herring-bone' and 'herring-bone' systems, respectively); (d) spiral curves. The V-incision is merely a duplication of the first system; but it does not result in double the quantity of latex. The herring-bone system has the advantage of requiring the minimum labour for collecting, as the latex flows down the groove in the bark. The long spiral curve has given good results. It consists of a series of parallel cuts running round the stem and each ending separately at the base of the tree. The full spiral system is drastic.

As regards the age or size at which Para rubber trees may be tapped, opinions seem to vary considerably. As a result of experience in Ceylon, Mr. Wright is of opinion that, if the circumference of a tree 3 feet from the ground is anything above 20 to 24 inches, it may be lightly tapped. Such a circumference cannot be attained in Ceylon much before the fourth, fifth, or sixth year.

The yield of rubber from trees of *Hevea brasiliensis* of known age varies very considerably according to climatic and soil conditions, methods of tapping, etc., etc. The results warrant the conclusion that trees from four to six years onwards, having a minimum circumference of 20 inches, may be expected to yield an average of 1 lb. to 3 lb. of dry rubber per tree up to their tenth year, and a higher yield in subsequent years.

It is scarcely possible, within the compass of this article, to enter upon the subject of the preparation of rubber for the market. Much useful information on this subject has been published in the *West Indian Bulletin* (Vol. V, pp. 210-23).

The Late Mr. A. J. Jordan. Readers of the *Agricultural News* will read with regret the announcement of the sudden death, in Trinidad, of Mr. A. J. Jordan, Curator of the Government House Gardens. Previous to occupying this position, Mr. Jordan had held appointments under the Imperial Department of Agriculture in Montserrat and Antigua. In August 1899 he was appointed Agricultural Instructor in Montserrat, and he held this position until his transference, in January 1905, to the Botanic Station in Antigua.



SUGAR INDUSTRY.

Antigua Central Sugar Factory.

Mr. H. A. Tempany, B.Sc., Acting Government Chemist, Antigua, has written as follows to the Imperial Commissioner of Agriculture:—

I have the honour to inform you that the Antigua Central Factory has now finished work for the season.

This year's crop has amounted to 2,300 tons of grey crystal sugar. The effect of last year's severe drought has been shown by the high fibre content of the canes handled, and this has caused the quantity of cane taken to manufacture a ton of sugar to be abnormally high. The quality of the juice has been good.

This year the factory has purchased a considerable quantity of cane from outside estates which have been unable to take off the whole of their crop on account of labour difficulties, incident on the extensive emigration of the labouring classes to Panama, a fact which speaks highly for the usefulness of the undertaking.

The Value of Sugar in Cattle Feeding.

The following is reprinted from the *International Sugar Journal*, for July:—

Our attention has been called to some correspondence in the *Farmer and Stock Breeder and Chamber of Agriculture Journal* on the advantage to be derived from the addition of soft, moist sugar (muscovado) and cane sugar molasses to the daily rations of farm stock, especially on dairy farms. It is well known how rapidly the live stock kept on our sugar plantations fatten up and improve after crop time commences, and they get the addition of cane tops and other saccharine waste with their daily rations.

We are aware of the introduction of 'Molascuit' and 'Molassine' as cattle foods; the former from cane sugar, and the latter from beet sugar products. The sugar contained in these foods is virtually denatured, and therefore has been very properly exempted from all duty. This is as it should be. But there is still room for a greater development of the principle of providing sugar for cattle feeding. In France we understand that steps are being taken to allow sugared cattle food to be prepared in bond, so that the denatured sugar may be exempt from taxation.

It remains for farmers and stock breeders to put to the test of experiment the suggestions contained in the following letter by 'Ragus,' which we have taken from the above-mentioned journal. All that remains is for farmers to order 1-cwt. parcels of the cheapest, soft, moist cane sugar (muscovado), and give the same to their stock in the proportion suggested by the correspondent. After a trial for a month the results might be made known:—

SUGAR AS A FOOD FOR LIVE STOCK.

'Sir,—As soft, moist cane sugars are now arriving from the West Indies and being sold at low prices, the attention of all dairy farmers and others should be given to the value of mixing a small quantity of this soft cane sugar with the rations of their cattle for improving the quality and increasing the yield of milk, an allowance of 1 lb. to 2 lb. of this sugar being sufficient for milch cows per head per day, mixed with their rations. Sugar has also been used with most satisfactory results for fattening pigs, allowing each pig 1 lb. to 1½ lb. of sugar per day, mixed with skim milk and barley meal. Pigs, after a time, eat

sugar with relish and never seem to get tired of it. A reference to the authoritative work of L. S. Ware (Philadelphia, 1902) will prove from the records of several official experiments the immense value in cattle feeding of simply mixing with the food some cane sugar. If dairy farmers and others would only use some moist cane sugar or cane sugar molasses to mix with the rations of their cattle, horses, and pigs, and keep a record of the results, the value of cane sugar as an addition to ordinary food stuff would soon be manifest.—I am, etc.,

RAGUS.'

Porto Rico.

The following information in regard to the sugar industry in Porto Rico is contained in the *Consular Report* for 1905:—

The most notable fact of the year is the great advance made in the sugar industry, which, thanks to the free market of the United States, is attracting capital. The moderate boom of last year is being rapidly improved upon and undoubtedly will continue until every acre fit for cane cultivation is so occupied. Two new centrals came into work during the year; five more will be ready for the next crop, while various bona fide projects are in hand for other factories. To feed all these schemes every acre suitable in the vicinity of the localities chosen is already engaged, and arrangements are rapidly being completed to make the more distant places available for cane supply by connecting them with the factories by means of light railways or branches of the existing railroad system.

Good sugar land now is worth anything from £20 per acre, from which a planter can expect a return of from £15 to £20 per acre, but the sugar manufacture itself can be profitably undertaken only by capitalists.

The average sugar production of the island is about 2 tons to the acre, which yield is capable of much improvement through the use of fertilizers and the practice of modern methods of cultivation and extraction.

The crop of the year exported, including molasses, was valued at £2,760,417, an advance on last year of £743,161.

MAYAGUEZ.

Mr. Vice-Consul Steffens reports as follows:—

'Owing to the high range of prices, the plantings of cane have been very important, in consequence of which there is now considerably more cane to be ground than the existing factories can possibly attend to, although all of them have increased their machinery, some even doubling their capacity.'

PONCE.

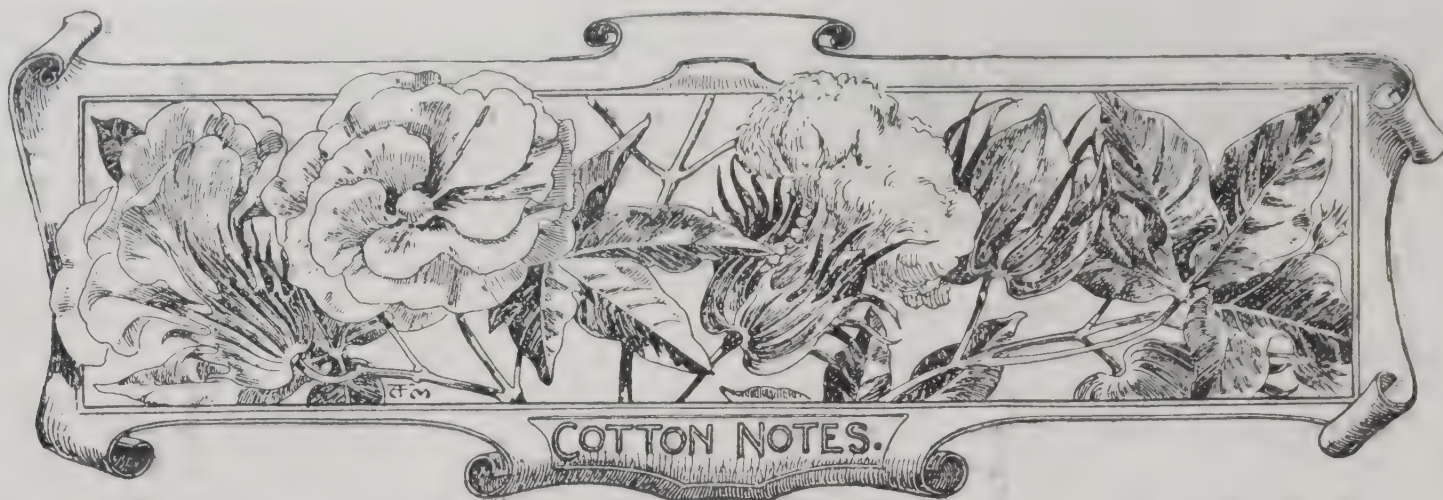
Mr. Vice-Consul Toro reports as follows:—

'The year 1905 was a prosperous one for this district, principally due to a very high sugar market and a large sugar crop. As a consequence, land suitable for cane growing rose in value, and some sales were made as high as £50 per acre, and, furthermore, some land was leased for cane growing, under five and ten years' contract, at £3 to £5 an acre per annum. Two new central factories were organized; one, of about 4,000 tons, by name "Central Florida" will take off its first crop next year, and the other one, of about 8,000 tons sugar, is under construction and will be ready in 1906.

'No clear or definite statement can be obtained about the new system of diffusion of bagasse; an increased extraction seems to have been obtained from canes, but the extra expenses for fuel are reported as extremely high.

'Prospects for the 1906 crop in this district are very good, and a large increase in exports is anticipated.

'Molasses continue to decrease in this district, as little muscovado sugars are now made.'



WEST INDIAN COTTON.

Messrs. Wolstenholme & Holland, of Liverpool, have forwarded the following report, dated July 26, on the trade in West Indian cotton in Liverpool:—

We have to report a fair business in West Indian Sea Island descriptions during the past fortnight, and prices are decidedly easier.

The demand has been almost entirely for qualities $13\frac{1}{2}d.$ to $15d.$, and spinners will not buy unless the quality is desirable, and easy prices are accepted.

The sales include Barbados, $14\frac{1}{2}d.$ to $15\frac{1}{2}d.$; St. Kitt's, $15d.$ to $15\frac{1}{2}d.$; Antigua, $15\frac{1}{2}d.$ to $16d.$; St. Thomas, $14d.$ to $15d.$; and Nevis, $13\frac{1}{2}d.$ to $14\frac{1}{2}d.$

Writing later (August 1), Messrs. Wolstenholme & Holland report as follows:—

Since our last report the market has been quiet for West Indian Sea Island descriptions, and prices continue in buyers' favour, for the lower qualities.

The sales include Barbados at $14d.$ to $15d.$ and St. Thomas at $15d.$

COTTON INDUSTRY AT ANTIGUA.

The following information is contained in a letter received by the Imperial Commissioner of Agriculture from Mr. H. A. Tempany, Acting Superintendent of Agriculture for the Leeward Islands, relative to the cotton industry at Antigua:—

In all 508 bales have been shipped this season from Antigua.

Good prices continue to be obtained for Antigua cotton; the last sales reported by the British Cotton-growing Association have given prices ranging from $13d.$ to $17d.$ per lb. for lint.

I enclose for your information a copy of a letter, relative to Antigua cotton, addressed to Dr. Watts by Messrs. Wolstenholme & Holland:—

Extract from letter from Messrs. Wolstenholme & Holland to the Hon. Francis Watts, Antigua.

'We have been very pleased with the improvement which has taken place in Antigua cotton this season. The staple is much more robust, and some of the small lots, for which we obtained $17d.$ and $20d.$ per lb., are as good as St. Vincent.

'We have had the pleasure of an interview with Sir Daniel Morris, and suggested that he should obtain the seed from these best lots. He tells us that he had anticipated our idea, and had communicated with you on the subject.

'The American Sea Island crop is doing badly, particularly in Georgia; we therefore hope that West Indian cotton will again command full prices.'

THE LEAVES OF THE COTTON PLANT.

During the short time the cotton plant has been growing in these islands, every one has noticed how its leaves have been subject to the attacks both of insect and fungoid pests.

The use of the leaves in the economy of the plant is very important. Wherever there is a tendency to injure them or reduce their efficiency, no pains ought to be spared in protecting them.

It should be remembered that none of the food material taken into the plant by the roots can be of any service to the plant until it has been elaborated in the leaves. The land may be tilled in the most careful manner, expensive manures may be applied; but if conditions are allowed to exist, which will lessen the efficiency of the leaves, much of the care and expense which have been previously bestowed on the land will be found to have been wasted.

From the time the leaves are formed, they are liable to be attacked by the aphid, while the cotton worm is ready to devour them; at any time the leaf-blister mite may check their normal growth. They may also be visited by the fungi which cause the 'rust' and 'mildew,' and the bacteria which cause 'angular spot.' All these pests have a tendency to impair the efficiency of the leaves.

The damage done to the leaves by the aphid is usually very slight, but it sometimes causes the leaves to fall prematurely. The deformed condition of the leaves, when badly attacked by the leaf-blister mite, makes them practically useless; and when attacked by fungi and bacteria they often fall just when they ought to be most useful.

It will be realized by every planter that, if the best results are to be obtained, the plants must be kept in a healthy condition. The efficiency of the leaves in preparing food material must not be impaired. It is not surprising that the plant throws off large quantities of bolls when the conditions are such that it cannot provide a sufficient amount of food to develop them properly.

To a great extent the remedy for such an unfortunate condition is in the hands of the planter. The cotton worm can be destroyed by a timely application of Paris green. In the case of the leaf-blister mite and the fungoid pests, prevention is better than cure. Where the leaf-blister mite is prevalent, no plants ought to be allowed to stand after the crop has been reaped, and diseased leaves should be picked and burned, and the plants dusted with sulphur and lime.

To fight against fungoid and bacterial pests, the plants should be kept healthy and strong; they should not be overcrowded. Leaves can do their work well only when they are liberally supplied with light and air. Cotton should be planted in straight, single rows across the field, so as to allow a free circulation of air; not more than one plant should be allowed to remain to the hole.



ST. VINCENT COTTON SEED.

Some disappointment was experienced at the beginning of the planting season owing to the low germination of the Sea Island cotton seed obtained by the Imperial Department of Agriculture from St. Vincent. Seed from cotton which had realized the best prices of that grown in Barbados was at once supplied instead, and good stands of cotton have been obtained. The unsatisfactory character of the seed obtained from St. Vincent has been carefully investigated by Mr. T. Thornton and Mr. W. N. Sands.

The following letter, dealing with the matter of the preparation of cotton seed for planting during the next season at St. Vincent, has recently been received from his Honour the Administrator:—

I have the honour to enclose for record at the headquarters of the Department, and for the information of Sir D. Morris on his return, a copy of correspondence with the Agricultural Superintendent from which it will be seen that due steps have been taken to impress upon the local planters the necessity for exercising the utmost care in dealing with this matter of cotton seed.

I presided at the meeting of the Agricultural and Commercial Society when Mr. Sands' paper was read, on which an interesting discussion followed. It was agreed, amongst other things, that timely arrangements should be made by the officers of the Department with the growers to ensure, as far as possible, a continual supply of seed-cotton at the factory for ginning from the date of its re-opening, and that the Department should make preparations for commencing ginning somewhere about the middle of November, the date to be fixed beforehand by the Department in conference with the association.

By this means it is hoped to avoid any lengthy storage of seed-cotton in the cotton-loft prior to ginning, thus reducing risk of injury to seed, as also minimizing the loss that would follow any such untoward happening as a fire.

The meeting was very unanimous as to the expediency of an earlier commencement of ginning operations than has previously been the case.

The following is a summary of Mr. Sands' paper:—

Mr. Sands mentioned in the first place that the unsatisfactory seed, namely, the seed of low germination, had not been produced on one estate alone, but on a number of estates from which the highest-priced cotton, as well as that of a poorer quality, had been obtained. Owing to the low germination and varying character of the seed, the Agricultural Department had been obliged to abandon its export, and all orders, which amounted to no less than 26,000 lb., had been cancelled.

Mr. Sands said he proposed to deal with the question under the following heads:—

- (a) Was the seed fully ripe when harvested?
- (b) Were the conditions under which the seed-cotton was prepared and stored after picking, and before ginning, likely to cause the seed to deteriorate?
- (c) Was the seed properly stored after ginning?

(d) Does the disinfection of the seed before planting cause it to germinate badly?

Many of the pickers would pick cotton from the green bolls because it was heavier and had fully-ripe and dry cotton; also the seed-cotton after it was picked had not been sunned at all, or only insufficiently sunned, and had then been placed in large heaps where it lay for some time without being touched, and where, in a number of instances investigated, it had developed much heat, and even in the factory where it was stored before ginning, a considerable amount of heat was also developed.

After ginning, the seed had been stored in cool, dry places, but unfortunately, in very large bulk.

To show that disinfection does not injure the seed, Mr. Sands described a number of experiments which had been carried on in St. Vincent, and stated that if seed were sent to the factory with a germination of 80 per cent., he would guarantee the same result after it had been disinfected and dried.

Summing up, Mr. Sands contended that the bad seed was due to one or more of the following causes:—

The seed was not fully ripe when picked.

The seed was not sufficiently sunned and dried before ginning. The seed-cotton not having been sufficiently sunned before ginning, changes had taken place in the stored seed, in continuation of those already started in the seed-cotton.

He suggested the following remedies:—

Pick the seed-cotton only when fully ripe.

Thoroughly sun and dry it before it is ginned.

Do not store it in large bulk, and turn frequently if the weather is unfavourable for drying it.

Sun the seed intended for planting for two or three days after ginning. Do not store seed in large bulk.

COTTON PROSPECTS IN ST. KITTS.

Mr. F. R. Shepherd, the Agricultural Superintendent in St. Kitt's, has forwarded the following brief report on the prospects of cotton planting in that island:—

The area planted in cotton in St. Kitt's for the coming season may be approximately estimated at 1,300 acres, and if the rains come in, the total area planted will probably be 1,500 acres.

Of the 1,300 acres already planted, 1,000 acres are planted as a 'catch crop,' and the remaining 300 as a main crop.

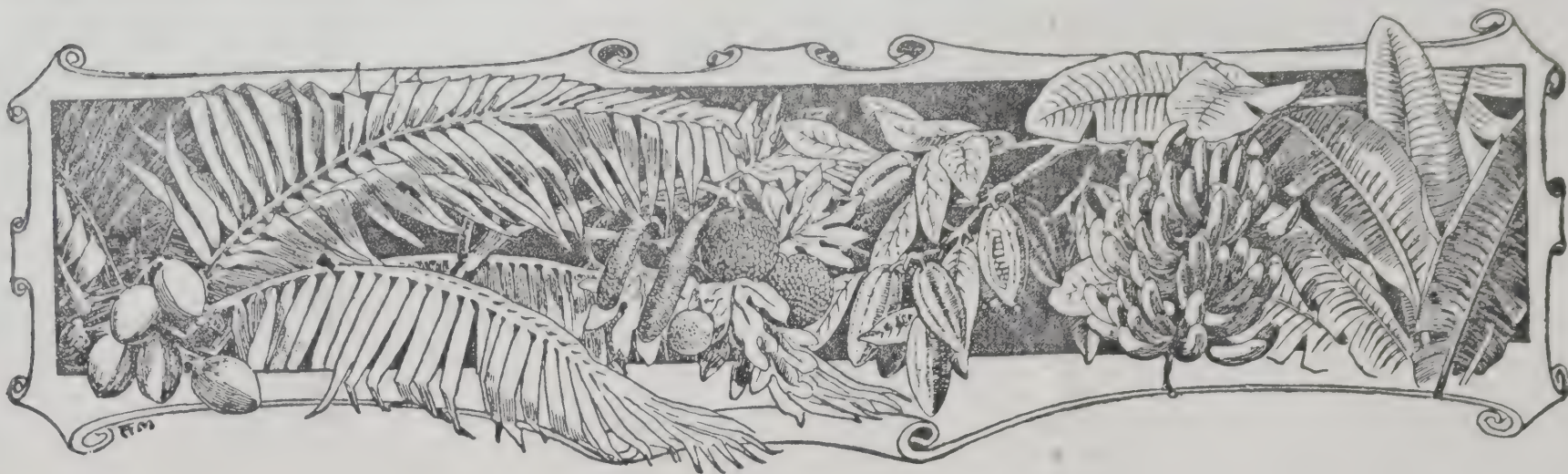
About one-half is planted in seed imported from Barbados through the Imperial Department of Agriculture, and the remainder in best local seed selected and disinfected.

The present condition of the young cotton is most satisfactory, the freedom from disease and worm being very marked. The prospects for the coming season are most encouraging, especially on those estates which planted early with the first rains.

At the Lodge estate, the property of Mr. J. D. Adamson, there is a small field of well-grown cotton planted in April from seed from Conaree estate. This cotton is planted one on each centre, and the trees have spread across the banks and give promise of a large return. In connexion with cotton as a catch crop, it is interesting to watch this experiment in early planting, as, if successful, there will be ample time for reaping before planting the cane.

The planters are all keeping a keen lookout for any attacks of worm, and are well prepared with Paris green and lime, for its destruction.

Interest and confidence in the industry have greatly increased this season, and owing to the good returns generally made last season, many estates are putting in larger areas, and some are planting cotton this year for the first time.



WEST INDIAN FRUIT.

AVOCADO PEAR.

Considerable interest is being taken in the cultivation of this tropical fruit in Porto Rico, Hawaii, and other parts for supplying the United States market. A good account of botanical investigations in connexion with the avocado and its cultivation is contained in Bulletin No. 77 of the Bureau of Plant Industry of the U. S. Department of Agriculture, from which the following extracts are taken:—

The avocado has, since the time of Columbus, spread from its home in America entirely around the tropics. That such an important food plant was confined to the American Continent until the post-Columbian contact with the old world, while numerous other plants, such as the yam, taro, and sweet potato, had already spread to parts of the old world, was probably due to the fact that the avocado will not easily survive long voyages, while most of the tropical root crops have much greater vitality.

The fruit spread but slowly before the last century, but in recent times its culture has rapidly increased, and it is now cultivated in most of the countries that are suited to its growth. It has been cultivated in India since about 1860, and has reached the islands of Madagascar, Reunion, Madeira, the Canaries, Samoa, and Tahiti. In Natal and Australia it is just gaining a foothold.

The avocado tree is 20 to 60 feet high, varying in habit from tall and rather strict to short and spreading. In favourable situations the top is very dense.

The flowers are perfect and are borne on loose axillary racemes near the ends of the branches, usually at the base of the year's growth.

The fruit in some varieties is long and slender; in others, nearly globular, varying from 1 inch to 6 inches in diameter. The outside covering in some forms is soft and pliable, often less than $\frac{1}{2}$ mm. in thickness, while in others it is hard and granular, in some of the Central American

forms reaching 3 mm. in thickness. The fleshy part of the fruit between the skin and the seed varies greatly in thickness, but it is always butyraceous in consistency, though in some cases much firmer than in others. In the better varieties the fibro-vascular system that enters the fruit from the stem is discernible only in the thin flesh at the very base of the fruit and at the base of the seed, which is toward the apical end of the fruit. The seed thus appears to receive its nourishment directly from the pulp by absorption, or ceases to receive nourishment before the fruit is fully formed.

In the coarser forms, the bundles can be traced from the stem throughout the pulp to the point where they enter the seed, and in some cases they are so prominent that the quality of the fruit is seriously impaired.

The points to be kept in mind in any attempt to improve the avocado are: (1) Shipping qualities, (2) uniformity, (3) extension of season, (4) seed reduction, (5) texture, (6) flavour, (7) yield, (8) size, (9) resistance to cold.

Avocados have been subjected to careful cultivation for such a short time that little is known concerning the conditions that influence yield. As with most tropical plants, climate has probably a greater influence than soil, and judging from the fact that in nature the trees frequently drop their leaves before the fruit matures, it may be expected that a rather decided alternation of wet and dry seasons is an essential.

In Hawaii it appears that several fruits in the same cluster mature. This has never been observed in Central America or the West Indies where large numbers

of the fruits set, but all but one of each cluster drop while still young.

If commercial fertilizers are applied, it would seem that the proper time is immediately after the young fruits have set.

If anything like the present prices can be maintained, the growing of avocados ought to become a very remunerative industry.



FIG. 16 THE AVOCADO PEAR.

(From *The Book of Trinidad.*)

TOBACCO FROM JAMAICA.

The *Bulletin of the Imperial Institute* (Vol. IV, no. 2) has the following report on a sample of tobacco sent to the Imperial Institute by the Director of Public Gardens and Plantations in Jamaica. This tobacco was grown experimentally under shade cloth during the season 1904-5 from Sumatra seed:—

The sample consisted of six leaves of the 'wrapper' type of cigar tobacco, showing a dull, olive-brown tint. The leaves were of fair length, uniform in colour, thin, and free from 'stains' and 'burns.' They were somewhat brittle when handled, but this was probably due to their having been packed between sheets of card-board, which had absorbed the moisture, rendering the leaves abnormally dry.

When ignited, the tobacco burned evenly and steadily, evolving a fairly fragrant aroma and leaving a greyish-white ash.

As the sample was very small, it was impossible to submit it to chemical examination. It was therefore sent to a firm of tobacco experts to be tried for wrapping cigars, and for the determination of its commercial value. The experts' report on the tobacco was as follows:—

'The tobacco is of very handsome appearance, thin in texture, and therefore highly productive as a "wrapper" for tobacco; in use it is somewhat "tender" and does not appear to have quite as much elasticity as Sumatra tobacco of similar texture; the burning is very fair, and the flavour not unsatisfactory. Similar tobacco, well put up, would fetch on the English market up to about 3s. per lb. for first lengths, say, 2s. 3d. per lb. for the second lengths, and from 1s. 3d. to 1s. 6d. per lb. for the third lengths.

'We feel sure that the soil and climate which have produced this tobacco are suitable for growing "wrapper" tobacco equal to most in the world, and if labour is plentiful and cheap and the area of suitable ground large enough, there is a chance in time of this district of Jamaica becoming a serious competitor of Borneo, Sumatra, and Java.'

The experts also suggest that it might be worth while to carry out a similar cultivation experiment in Jamaica with Java tobacco, as this would probably yield a 'wrapper' leaf which would be stronger in texture and of even better flavour than the present sample.

The results of the experts' trial of this tobacco show that it is of good quality, and that if a similar quality can be placed on the English market in quantity, it will probably realize remunerative prices.

PLANTING YOUNG TREES TOO DEEPLY.

Mr. W. J. Thompson communicates to the *Bulletin of the Department of Agriculture, Jamaica* (July) an interesting article entitled 'Planting of hard and soft-wooded plants.' It is pointed out that planters appear to fail to recognize that hard-wooded plants, like cacao and oranges, require very different treatment to what is required by such plants as sugar-cane and bananas. The following is a brief summary of the article:—

In many cases where cacao or orange plants are sickly or not fruiting, the trouble can be attributed to the fact that the plants have been set too deeply in the soil. Such trees have been found, on examination, to have their bases from 3 to 12 inches below the surface of the ground. It is true that nature comes to the trees' assistance, causing young roots to be formed just below the surface of the ground, but

these surface roots do not compensate for the loss of the natural upper roots, which have died off on account of being deprived of light and air. Too much time and care cannot be given to the proper planting of these hard-wooded plants.

Care should be taken to see that, when the soil has finally settled down, the base of the plant should be level with the surrounding ground. Frequently, young plants are placed out in a kind of shallow basin. This is responsible for a large percentage of plants not giving satisfactory results.

The way to prevent the plant from settling down too low is to leave the cultivated soil 6 inches higher than the surrounding ground when the plants are set out. When transplanting the young cacao plants, care should be taken to remove a little of the surface soil till the base of the young plant is reached. After this is found, make a small hole in the raised soil and put in the young plant just deep enough for its base to be on a level with the raised soil.

This may seem a small matter to some people, but it is estimated that one-fourth of the young trees planted out each year die, and that the fruiting trees are yielding only 40 per cent. as much cacao as they should, through the trees being planted too deeply.

AGRICULTURE IN SURINAM.

The *Consular Report* on the trade and agriculture of Surinam has the following reference to agricultural industries:—

CACAO.

Though there was improvement in the cacao industry, the year 1906 was anything but satisfactory from an agricultural point of view. The cacao disease [witch broom] still continued, and the crop was only 1,495 tons, against 843 tons in 1904, and 3,526 tons in 1899.

Experiments are being made with a view to stamping out the disease, but the results are up to the present doubtful, and even should they prove successful on the limited areas under treatment, it is doubtful whether it will be feasible to apply them to all the cacao in the colony.

The crop for the first quarter of the present year shows a further improvement, being 4,681 bags (of 100 kilos.), against 2,681 and 1,351 bags during the same period in 1905 and 1904.

BANANAS.

As stated in the last report, the cultivation of bananas for export has been commenced, and on May 19, 1906, an agreement was signed between the Colonial Government and the United Fruit Company, of Boston, U.S.A., by which it is agreed that the company shall buy all the fruit produced (up to a certain standard) on 3,000 hectares (7,413 acres) to be planted within the next three years.

RICE.

The rice industry continues to increase. It is, however, almost entirely in the hands of small land-owners, principally British Indian immigrants. The total amount produced in 1905 is estimated at 1,149 tons, against 875, 442, and 304 tons in the three previous years. The imports of foreign rice during the year amounted to 4,650 tons, valued at £38,760.

RUBBER.

A considerable quantity of Para rubber has been put in and appears to be doing well.

SISAL HEMP.

A large area has been planted with sisal hemp, and also appears to be doing well.

EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming, should be addressed to the Commissioner, Imperial Department of Agriculture, Barbados.

All applications for copies of the 'Agricultural News' should be addressed to the Agents, and not to the Department.

Local Agents: Messrs. Bowen & Sons, Bridgetown, Barbados. *London Agents:* Messrs. Dulau & Co., 37, Soho Square, W., and The West India Committee, 15, Seething Lane, E.C. A complete list of Agents will be found on page 3 of the cover.

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Agricultural News

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NOTES AND COMMENTS.

Contents of Present Issue.

A new work on the cultivation of Para rubber is briefly reviewed in this issue's editorial.

A note on the working of the Antigua Central Sugar Factory appears on p. 259. This is followed by a note on the feeding value of sugar. A brief review of the sugar industry in Porto Rico will be found on the same page.

The 'Cotton Notes' in this issue contain information on the prospects of the industry in several of the West India Islands. The results of the investigations into the unsatisfactory character of some of the St. Vincent cotton seed are discussed on p. 261.

An illustrated note on the avocado pear will be found on p. 262.

An interesting report from the Imperial Institute on a sample of tobacco grown under shade at the Hope Experiment Station, Jamaica, is published on p. 263.

A report by the Mycologist on cacao disease on an estate in Trinidad is published on p. 266. Recommendations are given for the treatment of diseased trees.

The cultivation of broom corn and the prospects of finding a market for this product in Canada are dealt with on p. 267.

Page 271 contains reviews of recently issued reports on the Botanic Station, Agricultural School, and Experiment Plots in St. Lucia; the Botanic Station in Tobago, and the Stock Farms in Trinidad and Tobago.

Trade in Green Limes.

Reference was made in the *Agricultural News* (Vol. V, p. 204) to a record shipment of green limes from Dominica early in June last. It would appear from the Leeward Islands *Free Press* that this enormous shipment had a disastrous effect on the market. This shipment, in addition to arrivals from Mexico, Montserrat, Trinidad, and Porto Rico, completely demoralized the market; a state of affairs which brokers thought would not recover for a month or six weeks.

There is no doubt that a trade of this sort, dealing with a special product, requires very careful nursing, if it is to become an asset of any value for the island. The fruit growers will have to form some sort of organization for the regulation of the output and their mutual protection.

Quality of Nevis Cotton.

It is much to be regretted that the quality of Nevis cotton has, this season, been very poor. In letters received by this Department from the British Cotton-growing Association, and from Messrs. Wolstenholme and Holland, Nevis cotton is spoken of as unsaleable.

This unfortunate state of affairs may be in part due to the drought, but it is feared that insufficient attention was paid to the necessity of planting only the best seed and to the subsequent cultivation of the crop. It cannot be impressed upon growers too strongly that unremitting attention is necessary at all stages in cotton cultivation. Growers, in Nevis especially, are therefore urged to remember this during the coming season.

Cotton from Carriacou.

The Grenada *Government Gazette*, August 1, contains correspondence from the Commissioner of Carriacou relative to sales of Sea Island cotton shipped from that island to the British Cotton-growing Association in May last.

The shipment included 2 bales of genuine Sea Island and 1 bale of a variety known locally as 'silk cotton,' which Mr. Whitfield Smith regards as 'a degenerate relic of the Sea Island type introduced into Carriacou many years ago.'

The former were described by the brokers as fairly clean and bright and of fair length; value, 13d. to 14d. per lb. The other bale was valued at 7½d. per lb. A trial shipment of this cotton was made to ascertain if it possessed any special market value. It would appear to be equal in this respect to the Marie Galante cotton generally grown in the island.

With regard to the Sea Island cotton, the results of the shipment are encouraging, when it is taken into consideration that this is a first attempt and that the peasants have not yet fully realized the importance of thoroughly cleaning their raw cotton.

Exports of Hayti.

According to the *Consular Report* on Hayti for 1905, there was a heavy fall in the export of coffee, and less logwood, yellow wood, and hides were exported than in 1904. The exports of guaiacum ('*lignum vitæ*'), cotton, and goat skins showed a slight increase.

The export of pite or hemp (fibre of *Agave americana*) is making considerable progress, and 1,209,428 lb. were exported during the year. The cacao crop was slightly under that of the previous year, while the coffee crop was one of the worst known.

The exports of cotton amounted to 3,287,669 lb. The same complaints continue to be made about the careless manner in which the cotton is cleaned and packed.

Exports of Zanzibar.

It is stated in the *Consular Report* on Zanzibar that the 1904-5 season's crop of cloves was the largest on record, amounting to 227,178 cwt. The island of Pemba furnished the greater part of this. The following season was a poor one for Pemba; but Zanzibar furnished more than an average crop. The total value of the clove exports in 1902 was £287,073.

The output of chillies was of the value of £9,014. The industry has suffered from the action of local merchants in mixing the chillies with an inferior kind grown in British East Africa.

The experiments made by the Government in the cultivation of vanilla have given most satisfactory results; about 1,400 lb. were sent to the United Kingdom during the year, realizing an average price of 4s. per lb. There are at present only 40 to 50 acres in the cultivation of vanilla, but, if the Arabs can be induced to take it up, there seems no reason why it should not in time become one of the staple products of the country.

Waste of Fruit Seeds.

An editorial in a recent issue of *Indian Planting and Gardening* draws attention to the enormous quantity of fruit seeds that are daily wasted in India. Mention is made of the mango. Every year millions of seeds of the finest varieties are thrown away after the fruit is eaten. Very few of the seeds develop into trees. It is usually the seeds of the small, turpentine-flavoured fruits which get sown.

Similarly, the seeds of such fruits as the litchee, the better-class varieties of 'plums' (*Spondias* sp.), the carambola, tamarind, jack tree, and many others might usefully be planted instead of being wasted, as is usually the case.

'But the people require to be shown and taught the value of planting fruit trees around their huts. It should be explained to them that such trees do not interfere with their cereal crops; that in seasons of good harvests they would yield an additional revenue, while in seasons of drought and scarcity they would afford wholesome food.'

These remarks are probably equally applicable in the West Indies.

Rubber Trees in Uganda.

In the Annual Report on the Forestry and Scientific Department of the Uganda Protectorate for 1905-6, it is stated that there are now 742 trees of Para and Castilloa rubber in the Botanic Gardens, in addition to 1,000 each of these trees and of *Funtumia elastica*, which have been planted on land adjoining the gardens.

The Para rubber trees have made satisfactory growth during the year and the ultimate success of this rubber-yielding tree is considered to be decidedly promising.

The trees of *Castilloa elastica* have also made good growth, but have been attacked by a boring longicorn beetle (*Inesida leprosa*).

Since the discovery of the native *Funtumia elastica* in Uganda, large numbers of young plants have been raised for distribution. Samples of rubber from wild trees of this species were submitted to Messrs. Hecht, Levis, & Kahn, of London, for valuation, and were reported to be worth from 3s. 2d. to 4s. 6d. per lb.

Cacao Cultivation in Guam.

In his *Useful Plants of Guam*, Mr. W. E. Safford states that cacao has been introduced into the island and thrives well. The use of permanent shade trees is not considered necessary in Guam. In clearing land for cacao, belts of trees are left as wind-breaks, while hedges of sappan wood (*Caesalpinia Sappan*) are often planted for the same purpose. Young cacao plants are sheltered by rows of taros or bananas planted in the intervening spaces.

For exposed situations *Erythrina indica* and the bread-fruit (both seedless and seeded varieties) are recommended for shading the cacao, care being taken to keep the lower boughs cut off, so as not to interfere with the growth of the cacao.

Some attention is paid to seed selection. Seeds are taken from the best and largest pods, which are picked from the best bearing trees, perfectly ripe and kept for a week or ten days.

In Guam cacao trees bear fruit almost continuously, but there are two principal crops each year.

No cacao is exported, as practically the whole of the produce is converted into chocolate. The custom of chocolate drinking is universal among the natives, who scorn the imported article. The beans are freed from pulp and gummy matter, dried in the sun, parched, and ground on stone slabs. The ground paste is formed into balls. Chocolate, as made in Guam, is thickened with flour or arrowroot. It is of fine flavour and is not adulterated in any way, except by the addition of sugar and flour.

The beans are sometimes kept in jars and allowed to 'sweat' to improve their flavour.

The plantations suffer greatly from the ravages of rats. The trees do not last long, being much subject to attacks of boring insects. On this account, and also by reason of the sensitiveness of the trees to hurricanes, cacao is not cultivated extensively, the natives preferring to devote their energies to cocoa-nut cultivation.

CACAO DISEASE IN TRINIDAD.

The following is a preliminary report by Mr. F. A. Stockdale, B.A., Mycologist on the staff of the Imperial Department of Agriculture, on a visit to a cacao estate in Trinidad, on which disease was reported to be prevalent:—

Mr. Stockdale—to the Acting Colonial Secretary, Trinidad.

Port-of-Spain,

July 16, 1906.

Sir,—Acting in accordance with instructions received from his Excellency the Acting Governor, I attempted to make arrangements for a visit to Mr. C. deVerteuil's estate at Montserrat, in order to investigate a disease of cacao, which was reported to be causing considerable damage. Finding that such an arrangement could not be made, I decided to visit Mr. V. deBoissière's estate, St. Marie, where the disease was also reported as being prevalent. I paid a visit to this estate on Saturday, July 14, accompanied by Mr. V. deBoissière and Mr. J. H. Hart, F.L.S., and went through practically the whole of the plantation, where I was able to examine many trees in order to gain a fairly accurate idea of the nature of the disease and its economic importance.

2. On entering the plantation, many of the trees were noticed to have the tips of the branches dying back. The first sign of the disease appears to be the drooping of the leaves, which soon afterwards dry up and assume a somewhat reddish appearance. The decay of the branch seems to commence at the tip and gradually to work backwards. The dead wood turns a brownish colour and dries up.

Microscopic examination in the regions of the brownish discoloration revealed the presence of a mycelium of a fungus, but careful search did not disclose any spores, and, therefore, it is at present impossible to identify it. In some twigs it was also noticed that a small insect had made an entrance through the buds into the pith of the young stem. The relation between the fungus and the insects has not yet been demonstrated, nor could their direct bearing upon the disease be determined during my short visit to this estate.

3. *Extent of Damage.*—In one corner of the plantation this disease was troubling several trees, but, in most cases, it appeared to be limited to the tips of the younger shoots, and in very few instances were whole branches killed out.

4. *Suggested Remedies.*—As this disease appears to commence with the tips of the young shoots, and to work downwards, all twigs that present this brownish drying-up should be removed at a point somewhat below the lowest limit of the disease. These diseased portions should be removed from the plantation and destroyed, preferably, by fire. On no occasion should diseased branches be left lying on the ground under healthy trees, as they often become covered with spores, and are therefore a source of infection. The stumps of the branches from where the diseased portions have been removed should be tarred in order to prevent further infection of the tree by means of fungus spores.

CANKER DISEASE.

5. On proceeding further into the plantation many large branches were observed to be dead. On examination these showed that they were covered with fungus spores which had pushed through cracks in the discoloured bark. The spores are of several different kinds, and vary in colour from whitish yellow to deep red. These spores belong to a fungus of the

genus *Nectria*, which is the organism that causes 'Canker.' Undoubtedly most of the dead branches and stems had been killed by this fungus, for its symptoms, viz., exudation of a gummy liquid from the bark and claret-red discoloration of bark, were noticeable. From a superficial examination throughout this part of the plantation, the branches appeared to be the parts of the tree that were suffering most, but in many instances the stems of the trees showed that they were also attacked.

REMEDIAL MEASURES.

6. This fungus belongs to a group of fungi that are wound-parasites; remedial measures have frequently been suggested and have proved beneficial. Numerous articles on the methods used in combating this disease have frequently appeared in the publications of the Imperial Department of Agriculture for the West Indies and also in the *Bulletin* of the Botanical Department of Trinidad, and therefore I will only briefly mention those which I consider the most important:—

- (a) All dead trees killed by 'canker' should be cut down at the ground and destroyed, preferably by burning.
- (b) All diseased branches should also be removed and destroyed. The cut surface on the tree, after removal of diseased branches, should be coated over with a layer of tar, to prevent rotting and further infection.
- (c) All discoloured bark, and about an inch or so of the surrounding apparently healthy bark, should be cut out from all attacked stems—the diseased bark being collected and burnt, and the wound on the tree tarred over.
- (d) When the trees are pruned, all the cut surfaces should be covered over with a coating of tar. It is also very important, in the pruning of trees, that no cutlass or pruning hook that has been used previously for cutting out diseased portions of trees should be used for pruning purposes, unless it has been properly cleaned and sterilized; otherwise spores may be carried from a diseased tree to a healthy one.
- (e) The importance of pruning, preferably done in the dry season, is obvious, for it allows the entrance of more sunlight. This, in Ceylon, is considered often to prevent the spores of the fungus from germinating, and aids the tissues of stems, etc., in their efforts to heal wounds.
- (f) The burial of all husks is also desirable, for several instances were noticed of the fungus living on the old husks that had been heaped up. The heaping of husks, therefore, causes another source of infection.

7. The plantation of younger cacao was also examined, but very little disease was noticed, most of the trees being in a healthy condition.

8. In conclusion, I feel sure that the above remedies, if adopted, will keep the disease well in hand, and that the systematic removal of all diseased branches, etc., and tarring of all wounds should overcome the disease eventually. This would possibly become the more marked with drier weather.

I have, etc.,

(Sgd.) F. A. STOCKDALE,

Mycologist.

DESTRUCTION OF RATS BY VIRUS.

In view of the interesting experiments that have been carried out in the West Indies, by the Imperial Department of Agriculture, in the use of virus for destroying rats, the following note from the *Journal of the Board of Agriculture* (Great Britain) for June is likely to be of interest:—

During recent years rats appear to have become much more numerous in most parts of the country, and the damage they cause to crops, poultry, game, and even young trees is undoubtedly very great. Until recently the usual means of destruction consisted of traps, poison, and ferrets, but during the past few years attention has been given to inoculation with a virus, which sets up a virulent disease in the animals and quickly kills them. There are several such preparations before the public, some of which are fluid and some solid. Perhaps, on the whole, the fluid preparations are the most convenient to use, and they are certainly quite as effective as the others. The material consists of a nutrient medium containing the organisms (bacilli), which, when introduced into the body of a rat, set up a disease allied to the most virulent form of typhus fever. Dry bread, cut into small cubes, is soaked with the virus, and these cubes being laid down in suitable places are readily eaten by the rats, usually with fatal results. No domestic animals are at all affected by the preparation.

In order to test the value of the method, the Agricultural Chamber of the province of Saxony obtained a supply of one of the preparations and distributed it amongst seven selected farms. The results show that at six of the farms the rats were practically exterminated. At the seventh the virus appears to have had little effect, a result that has also been noticed elsewhere, and which is supposed to be due to the fact that a natural attack of the same or a nearly-related disease had rendered the surviving rats practically immune to infection.

Information of a similar character has reached the Board with regard to the use of rat virus in England, and they would therefore direct the attention of agriculturists to this means of getting rid of a troublesome pest. While there seems to be little doubt that, in the majority of cases, a single farm may be temporarily cleared of rats by this means, it is evident that but a short time may elapse before such a farm is again invaded by animals that move on to it from infested places in the neighbourhood. It would therefore appear to be highly desirable that agricultural clubs should take the matter up and act on a large scale, or the farmers in a parish or county might enter into a temporary association for the purpose of using the virus on every farm on a definite date. Operations on a large scale would mean considerable attention as to organization, but the probable result would appear to warrant the necessary steps being taken.

BROOM CORN IN MONTSEERRAT.

In view of the efforts that are being made to develop a small industry in broom corn in Montserrat, the following extract from the Annual Report on the Botanic Station for 1905-6 is likely to be of interest:—

A second trial has been given to this crop, and the results show an improvement. The area under cultivation was $\frac{7}{80}$ acre. The land was spaded, and one half of the plot manured at the rate of 36 tons per acre.

Seeds were sown with the Planet Junior drill on October 12; one half of the plot 3 feet apart, and the other half 3½ feet between the rows. The cultivation is very simple, and

the crop matures in three months. Bending of the brush was prevented by lopping or bending down the heads as they pushed from the sheath.

The brush was reaped at three different times, and after cleaning off the seeds by a home-made comb, was dried under cover. The yield from the plot was 63 lb. of dried brush; this was at the rate of 540 lb. per acre.

A shipment of a sample bale, weighing 56 lb., consisting of 49 lb. of long brush and 7 lb. of small heads, was made to Mr. J. Russell Murray, of Montreal, Canada. His report on the shipment was as follows:—

‘I have thoroughly examined the broom corn, and beg to report that it is of first quality in every respect. It is of good colour and free from seeds. The sample of dwarf corn accompanying it is fairly good. This corn can be marketed in Montreal or any eastern seaport town at from 4½c. to 6c. per lb. At present it is bringing 6c. This, of course, includes freight and shipping charges.

‘Should this cultivation be increased, you would be able to grow two crops per year, and there is no competition here, as broom corn is not grown in Canada, and heavy rail charges have to be met from the states of Ohio and Illinois.

‘I shall be pleased to take charge of any shipment you can send me, and if you can assure buyers here of a steady supply, they will make contracts for all you can produce.’

In view of the above encouraging report, it yet remains to be seen whether this crop can be handled with sufficient skill to make it profitable. It does not seem probable that a much higher yield of brush could be obtained per acre; but as two crops could be reaped from the same land in six months, this would mean, at the price quoted, a gross return of about £11 per acre.

The chief items of expenditure, exclusive of preparing land, manure (if any), and weeding, would be:—

	£	s.	d.	(Estimated)
Lopping brush	2	0		per acre.
Reaping	8	0		" "
Cleaning	10	0		" "
	1	0	0	" "

This would mean for a single crop.

On estates, where work is generally done by the task, this expenditure would probably be much less.

On a large scale it would be almost necessary to have a machine to sow the seeds.

DEPARTMENT NEWS.

The Imperial Commissioner of Agriculture is expected to leave the United Kingdom on August 31 for Canada.

Mr. Henry A. Ballou, M.Sc., Entomologist on the staff of the Imperial Department of Agriculture, has returned to the West Indies, having resumed the duties of his office at St. Kitt's on August 18. As already stated in the *Agricultural News*, Mr. Ballou will spend some time investigating insect pests in the Leeward Islands and in St. Lucia before returning to Barbados.

Mr. F. A. Stockdale, B.A., Mycologist on the staff of the Imperial Department of Agriculture, returned to Barbados from Trinidad in the S.S. ‘Ocamo’ on Wednesday, August 15.



GLEANINGS.

According to the *Consular Report*, 1,889 tons of castor oil seeds were exported from Pernambuco, Brazil, during 1905.

His Majesty the King has been pleased to accept from the West Indian Produce Association a packet of tea from the estate of the Hon. H. E. Cox, Custos of St. Ann, Jamaica.

Ripe-rot (*Gloeosporium musarum*) injured 50 per cent. of the banana crop in Hawaii, especially in fruit not properly packed; estimated loss, \$30,000. (*Yearbook of the U.S. Department of Agriculture*, 1905.)

Mr. R. D. Anstead, B.A., Agricultural Superintendent, has been appointed to be, provisionally and temporarily, the Agricultural Authority in Grenada under the 'Plant Protection Ordinance, 1906.'

The preference granted by Canada to West Indian sugar is having good results. Not a pound of Trinidad sugar found its way to the United States last crop. (*International Sugar Journal*.)

The world's average production of raw silk is 42,332,000 lb. Of this amount China and Japan are responsible for 25,336,000 lb. Italy is the largest producer in Europe. (*Atlas of the World's Commerce*.)

Attention has been drawn to an error in an article on the cocoa-nut industry in the Philippines (*Agricultural News*, Vol. V, p. 201). Through a miscalculation, the average yield of copra from 1,000 nuts, in the Tayabas province, was given as 138 lb. The figures should have been 620 lb.

The arrivals of cacao this year (1906) at New York, up to July 22, totalled 285,811 bags, as compared with 275,145 bags at the same date last year, 257,387 bags in 1904, and 214,058 bags in 1903. (Messrs. Gillespie Bros. & Co.'s Market Report, July 27, 1906.)

The number of crates of onions exported from Antigua during the last five years has been as follows: 1901, 1,300; 1902, 546; 1903, 550; 1904, 4,524; 1905, 1,078. The value of the exports has been: 1903, £101; 1904, £860; 1905, £233.

Mr. Agar, writing to the West India Committee from Dominica, on July 3, reported that the first shipment of citrate of lime on a commercial scale was being made. 'There was no doubt that, should the experiment be successful, the manufacture of citrate of lime instead of concentrated lime juice would rapidly develop.'

According to the *Consular Report* on Surinam, the prices of balata continued low during 1905, and the amount collected was only 244 tons, against 260 and 370 tons in the two previous years. The value of the year's export of balata was £34,630.

The British West Indies have, to a large extent, recovered the position they held in the banana trade, the imports from that quarter having been more than double those of 1904, and exceeding one-third of the total imported into the United States. (*Consular Report* on the New York district for 1905.)

In an experiment with Tenerife onion seed at the Experiment Station in the Bahamas, 852 lb. of dried and cleaned onions were reaped from $\frac{1}{40}$ acre. Valuing the crop at the ordinary selling price of 2d. per lb., the yield was worth £7 2s. The Board of Agriculture has authorized the purchase of 60 lb. of seed for distribution.

According to the *Rangoon Gazette*, the kernels of the common wild almond (*Terminalia Catappa*) yield, by cold expression, 50 per cent. of oil. This is said to be 'agreeable to the taste, has hardly any colour, and is at least as nutritious as the so-called "salad" oils, that are sold in the shops and devoured with so much avidity and relish in India.'

The shipments of produce from Barbados, up to August 10, amounted to 43,030 tons of sugar and 58,371 puncheons of molasses; at the same time last year 31,539 tons of sugar and 37,874 puncheons of molasses. The sugar crop is now closed. (Messrs. James A. Lynch & Co.'s Market Report, August 13, 1906.)

The importation of cacao into New York continues to increase, but the total value has not risen in proportion to the increase in quantity. The importation from the West Indies shows an increase: that from the United Kingdom remains about the same, while larger quantities have been imported from the rest of Europe. (*Consular Report* on the New York district for 1905.)

At the request of the Secretary of the Jamaica Agricultural Society, a quantity of the small fish, known in Barbados as 'millions,' were sent to Jamaica by the Imperial Department of Agriculture. They are reported to have arrived safely. These fish are intended for the tanks at the Titchfield Hotel, Port Antonio, where it is hoped they will assist in reducing the numbers of mosquitos.

The great improvement in cane sugar machinery, even in the last five years, has considerably reduced the cost of manufacture, but still greater improvements are possible in the cultivation of the cane by irrigation, the use of steam ploughs, and the selection of canes to suit the soil and condition of the ground; and these improvements are steadily being introduced. (*International Sugar Journal*.)

A recent publication of the Board of Agriculture gives the number of bunches of bananas imported into the United Kingdom from the British West Indies in 1905 as 1,218,922. During the same period 4,518,990 bunches were imported from foreign countries (chiefly the Canary Islands and Costa Rica). The only other West Indian fruit imports enumerated are: lemons, 2,088 cwt.; oranges, 103,257 cwt. Lemons and oranges were imported from foreign countries to the extent of 834,844 cwt., and 4,963,625 cwt., respectively.

CULTIVATION OF CHILLIES OR CAPSICUMS.

In connexion with the efforts being made to encourage the cultivation of chillies in Nevis, it may be of interest to state that the experiment referred to in the *Agricultural News* (Vol. V, p. 232) is reported upon in the Annual Report on the station. Owing to dry weather, the results were not as good as in the previous year, but they appear to indicate that the cultivation of chillies would prove remunerative.

Mr. Hollings makes the following useful suggestions :—

It is essential, in order to preserve their bright colour, that the peppers should not be picked till thoroughly ripe, and then dried as rapidly as possible. The drying is easily accomplished in the sun and wind in trays with fine wire-netting bottoms, so as to allow the air to circulate freely. These trays should fit into a rack one above the other, but with a good air space between them; the trays can then easily be put out in the sun, and if rain threatens, run into their rack under cover instantly.

Peppers lose roughly about 70 per cent. of their picked weight in drying; about 2 per cent. are stalks, which have to be removed before shipping, although they should always be picked with them on. From 6 to 7 per cent. will, with the most careful picking and drying, be slightly discoloured and should be rejected from shipment; they will be quite good for seed, and the remaining 23 or 24 per cent. are fit for the market.

Even such pungent things as peppers are not free from the attacks of worms. The resulting crop of this season was carefully selected and packed in barrels for shipment, which was, however, unavoidably delayed. When the barrels were opened and examined again before shipment, they were found to be badly attacked by these worms and the envelope or skin nearly destroyed. In some cases, the worm does not seem to attack the seeds.

PIG BREEDING IN TRINIDAD.

The Annual Report on the Government Stock Farm in Trinidad has the following on the subject of pig breeding :—

Two new breeds of pigs were added to the farm—Poland-China and Berkshire. The former are not well known in Trinidad, but seem to be well adapted thereto. The favourite sized pig for the market is one giving from 100 lb. to 150 lb. weight cleaned; this quantity can generally be easily disposed of, whereas a larger size may leave an overplus. The Poland-China does not exceed this size, and is a plump, pleasing pig, giving good results for feeding. They do not seem to give large farrows, and should, I think, be kept to themselves, and not used for crossing.

The Berkshire is better known, and will grow almost as large as a feeder wants; they do well and give good results, and are excellent for crossing and improving our common pig. As these two breeds were started young no result came during the year, but at the present moment some very nice little ones have appeared. The Tamworths did well during the early part of the year with their first farrows, but the second lot developed white scour to which they succumbed. The older ones were disposed of and replaced by an entirely new lot. These are just having their first farrows which are decidedly good, and prove the wisdom of parting with those which unfortunately developed that ailment so fatal to young animals of all kinds.

CASTOR OIL SEED TRADE.

In a recent issue of the *Agricultural News* (Vol. V, p. 235), information was published relative to the castor oil seed trade in the United Kingdom. The following letter, addressed by the Bureau of Plant Industry, U. S. Department of Agriculture, to the American Consul at Grand Turk, deals with the production of this product in the United States :—

We have your letter of March 16 addressed to the Assistant Secretary of Agriculture, enclosing samples of castor oil beans and asking for information in regard of the same. The best kinds of castor oil beans come from Italy, Calcutta, and Madras. The plant is cultivated in the United States from Kansas to the Gulf of Mexico. In 1895, Kansas produced 361,000 bushels of seeds from about 24,000 acres, the seeds weighing 46 lb. to the bushel. In Iowa the yield is 15 to 25 bushels per acre, whereas in the Southern States 35 to 40 bushels might be raised. The yield per acre is about the same as that of wheat, varying, like it, with the fertility of the soil. The seed sells at \$1.25 per bushel.

COMPOSITION OF COCOA-NUT WATER.

In consequence of a suggestion that sugar might be extracted from the 'water' of the cocoa-nut on a commercial scale, a sample of this liquid, which is at present a waste product in the manufacture of copra, was sent from Ceylon for examination at the Imperial Institute. The report of the Director is published in the *Tropical Agriculturist* for June.

While it will be seen that it is not likely that the manufacture of sugar from this product would be possible on a commercial scale, it may be of interest to publish the following extracts from this report to indicate the composition of cocoa-nut 'water':—

CHEMICAL COMPOSITION.

Saccharine constituents :

Mannitol	...	...	1.8 per cent.
Cane sugar	...	...	0.1 " "
Glucose	...	...	0.9 " "

Acid constituents :

Volatile acid (as acetic)	...	0.07 " "
Non-volatile acid (as tartaric)	...	0.41 " "
Ash	...	0.50 " "
Water	...	96.00 " "

The present sample of 'water' from Ceylon cocoa-nuts appears to be abnormal in containing mannitol in place of almost the whole of the glucose and cane sugar usually present. It would be interesting to know whether this constantly occurs in nuts grown in Ceylon, or whether it is characteristic of a peculiar variety of nut.

It is clear from the foregoing results that it would be impossible to manufacture sugar from cocoa nut 'water' as represented by this sample, since it contains only 0.1 per cent. of cane sugar. Further, it is highly improbable that this could be done at a profit, even when the 'water' contains the whole of its saccharine constituents in the form of cane sugar. Cocoa-nut 'water' contains, at the most, only about one-fifth the amount of sugar present in the juice of the sugar-cane, and as the cost of extraction would be much greater in the former case, there seems little likelihood that the 'water' could be successfully utilized as a raw material for sugar manufacture, even though it is at present a waste product in Ceylon.



BEE KEEPING.

How to get Bees out of Houses.

An article has been published in *Gleanings in Bee Culture* on 'Bee Hunting.' Special attention is drawn to this, as it gives a simple means of getting rid of undesirable swarms in houses without causing damage to the latter. It happens sometimes that the bees have their entrance above the front-door or a window and in this way become a great nuisance. Recourse is generally found in the wholesale destruction of the bees, with the consequent tearing up of parts of the roof, etc.; not to speak of the stings that are served out to the intruders. This nuisance is avoided if the course recommended in *Gleanings* is carried out:—

From a hive previously prepared for the purpose, take all the frames of brood except two, filling the vacant space with full sheets of foundation or combs ready built, and then, after introducing an Italian queen, proceed to the scene of action.

Take with you all the necessary tools, etc., so that progress may not be hindered in substituting articles accidentally left at home. Among the necessities are: the nucleus hive, lumber for platforms, Porter bee-escapes for each hole, nails, saw, and a good smoker. An assistant is needed, and after getting a position near the entrance to the wild-bee hive, adjust the Porter escape so that all bees inside must pass out, not to return. Then construct the platform so that, when the nucleus hive is set thereon, the entrance of it will face and be next to the exit of the escape. Now blow a whiff or two of smoke into both entrances, and the whole operation will be finished for the time being. After five or six weeks have elapsed, fire up the smoker, throw in a small handful of sulphur, pull off the Porter escape, and apply the fumes vigorously through the hole, changing the air inside, leaving a dainty harvest for your swarm on the outside to rob out, which they will surely do in less than ten days.

Bee Keeping in St. Lucia.

In the Annual Report of the Agricultural Instructor in St. Lucia for the year 1905-6, the following reference is made to the progress of the bee-keeping industry in that island:—

There are now some 450 colonies of bees in modern hives in St. Lucia, including two small school apiaries at Choiseul and Laborie, which are doing well; it is probable that other school apiaries will soon be started.

The honey crop for the past year was not a particularly good one: while some bee keepers averaged 100 lb. of surplus honey per colony, others in less-favoured districts realized only 50 lb.

There has, however, been a satisfactory difference in the reception of St. Lucia honey in the London market, owing to shipping in tins only a thoroughly ripened article, which realized in the open market 22s. 6d. to 23s. 6d. per cwt.

Bees'-wax.

Mr. H. A. Tempany, B.Sc., has forwarded the following memorandum on a cake of bees'-wax found on the windward coast of Antigua:—

An interesting find was made a short while back on the windward beach of one of the small islands off the windward coast of Antigua. It consisted of a large cake of bees'-wax weighing about 100 lb., which had been washed up by the sea, and which in all probability had formed part of the deck cargo of some steamer crossing the Atlantic and had been either thrown or washed overboard during bad weather.

The discovery is interesting in view of the set of the ocean currents, which, flowing almost due west, cause it to be a common thing for debris and wreckage from ships in mid Atlantic to be washed up on the windward shores of West India Islands.

PLANTING CEDAR TREES.

The *Port-of-Spain Gazette*, of August 5, discusses the cedar wood industry of Trinidad and gives the substance of an interview with Mr. C. S. Rogers, Government Forest Officer, on the subject of planting cedar trees. The following is a brief summary of the article:—

The cedar industry in Trinidad is at present in a very flourishing condition. The coastal steamers have frequently to refuse the logs, on account of their limited stowing capacities, and many sloops are engaged in carrying the wood. It is pointed out, however, that there is grave danger of the supply being exhausted, unless some systematic effort is made to replace the trees.

If a planter intends to have a cedar plantation pure and simple, the best method is to plant in rows about 7½ feet apart each way. As soon as the plants are large enough to interfere with one another, say, in five to ten years, every other tree should be cut out. As soon as the remaining plants obstruct one another's light and air, the plantation should again be thinned; this time the even numbers should be removed from one row and the odd from the next. In about twenty-five years from planting, the trees are ready for cutting and should be worth £1 per tree. At the end of fifty years, those left would be worth from £3 to £5 per tree.

An alternative method consists in placing the trees 24 feet apart each way, cultivating the intervening spaces in catch crops. This method is less expensive and some immediate return on capital expended would be received.

ARROWROOT IN BERMUDA.

The *Annual Report* on Bermuda for 1905 has the following reference to the arrowroot industry:—

There is one arrowroot factory, which is equipped with modern plant, and is capable of producing a large quantity of this valuable commodity.

The arrowroot manufactured in the colony is of an excellent quality and commands a high price in home and foreign markets. The price (retail) per lb. in London is about 2s. 6d., as compared with 1s. and 9d. per lb. for St. Vincent and other arrowroot. The cultivation and manufacture of this product should be increased.

The export of arrowroot amounted to 5 tons 12 cwt., valued at £840, as against 10 tons 2 cwt., exported in 1904, valued at £1,398.



ST. LUCIA: ANNUAL REPORTS ON THE BOTANIC STATION, AGRICULTURAL SCHOOL, AND EXPERIMENT PLOTS, 1905-6.

Botanic Station.—The total expenditure on the Botanic Station and the experiment plots in the country districts was £815 9s. 6d. The sum of £58 was derived from the sale of plants, etc.

The rainfall at the Botanic Station during the year amounted to 72.64 inches. This is the lowest rainfall since 1900, being 5.08 inches below last year's return, and 21.43 inches below the average for the past sixteen years.

The general condition of the station appears to be satisfactory. A number of new plants have been planted out during the year.

The usual attention has been paid to the raising of plants in the nursery for distribution. The total number of plants raised at, and distributed from, the nurseries at the Botanic Station and Agricultural School was 25,675, or 16,380 more than the number distributed from these sources in the previous year. This large increase is due to the very considerable demand for lime and cacao plants. While this is an indication of extensive planting operations, Mr. Moore points out that it must not be considered as a guide to the extent to which the cultivation of these plants is being increased, since many estates have their own nurseries for the raising of seedlings.

Agricultural School.—The total expenditure on the school, including the Windward Islands Agricultural Scholarship, but excluding the emoluments of the Officer-in-charge, amounted to £719 16s. 2d.

The results of the two half-yearly examinations, conducted by the Head Office, were fairly satisfactory and indicated that due attention had been given to the indoor work of the school.

Useful work has been done in the experiment plots attached to the school. A good-sized plot of the 'dwarf' or Chinese banana has been established, from which suckers could be distributed in the event of a demand arising.

The orange plot is affording the pupils experience in budding operations: 550 plants, budded by the boys, were raised during the year. Fifty lime trees have also been planted out as an object-lesson.

All the ground provisions required for feeding the boys were, as usual, produced on the premises.

The live stock at the school include woolless sheep, Belgian hares, bees, and poultry. A cow is kept for the supply of milk. The object of the apiary is the instruction of the boys in bee keeping. A number of poultry of good breeds were imported during the year, and eighty-nine chickens were raised for distribution. An incubator has been introduced with very satisfactory results.

Experiment plots.—Mr. Hudson reports upon the seedling sugar-cane experiment plots, the cacao plots, and also upon the experimental planting of fruit and cotton.

Plants of two seedling canes (B. 208 and D. 95) were supplied to the five principal sugar estates in St. Lucia, and Mr. Hudson gives an interesting account of the results.

With regard to the cacao experiment plots, it will be seen that that at Soufrière has continued to show an increase in yield as the result of good cultivation and manuring. The history of this plot should go a long way towards convincing planters and peasant proprietors of the desirability of following the methods recommended by the Department. Two new plots were taken up during the year under review, and they are already showing considerable improvement, owing to the treatment they have received.

The report contains references to a number of interesting and important subjects connected with the cultivation of cacao and rubber.

TOBAGO: ANNUAL REPORTS ON THE BOTANIC STATION, ETC., 1905-6.

Botanic Station.—The total expenditure on the station, including salaries, was £659 16s. 1d. The receipts from the sale of plants and produce amounted to £38 12s. 2½d.

The Curator is again able to report a satisfactory extension in the plant distribution work, necessitating the enlargement of the nursery. The number of plants distributed from the station was the largest since the station was established, viz., 13,694—a very creditable increase of 4,159 over last year's total.

The general condition of the station is satisfactory, a number of minor improvements having been made.

Experiments were carried on at the station with a large number of economic plants. Cotton of fairly good quality was produced in the small experimental plot.

The rainfall at the Botanic Station during the year was 71.29 inches, which was well distributed.

Agricultural Instructor.—The duties of the Agricultural Instructor are mainly in connexion with the improvement of Crown Land holdings. Some advance is reported.

The increase in cacao cultivation is worthy of note. The returns show that there were 9,845 more cacao trees than in the year 1904-5; 4,345 of these being bearing trees. The shipments of cacao from the island were 1,085½ bags in excess of the previous year's shipments.

A cacao manurial plot was started during the year at 'Caledonia' estate under the supervision of the officers of the station, regular monthly visits being paid by the Agricultural Instructor.

TRINIDAD: ANNUAL REPORTS ON THE GOVERNMENT STOCK FARMS, 1905-6.

Mr. C. W. Meaden, the Manager, reports that the health of the stock at the Trinidad farm has been satisfactory during the year, with the exception of a recurrence of strongylus among some of the yearlings. Twenty-eight cases terminated fatally. Two bulls were imported, but both died soon after arrival. During the year, 143 calves were born.

The auction sale in January, realized the sum of £572 10s. 10d.; the total sales for the year amounted to £821 14s. 0½d.

Two new breeds of pigs were added to the farm—Poland-China and Berkshire. Good results were obtained from the poultry yard, the profits being nearly £40.

As regards the branch farm at Tobago, the manager (Mr. Henry Meaden) reports a much more profitable year than the last. Full advantage has been taken of the services of the stud animals, and the health of the stock has been excellent. The annual sale, on August 9, realized £141. The total receipts during the year were £491 11s. 3½d.

MARKET REPORTS.

London,—August 1, 1906. Messrs. KEARTON, PIPER & Co.; Messrs. E. A. DE PASS & Co.; 'THE WEST INDIA COMMITTEE CIRCULAR' July 25; 'THE LIVERPOOL COTTON ASSOCIATION WEEKLY CIRCULAR,' July 27; and 'THE PUBLIC LEDGER,' July 28, 1906.

ALOES—Barbados, 15/- to 60/-; Curaçoa, 20/- to 55/- per cwt.

ARROWROOT—St. Vincent, 2d. per lb.

BALATA—Sheet, 1/4 to 1/11; block, 1/4 to 1/4½ per lb.

BEES' WAX—£8 to £8 10s. per cwt.

CACAO—Trinidad, 57/- to 63/- per cwt.; Grenada, 49/- to 54/- per cwt.

CARDAMOMS—Mysore, 7½d. to 3/- per lb.

COFFEE—Jamaica, good ordinary, 39/- to 41/- per cwt.

COTTON—West Indian, medium fine, 6.55d.; West Indian Sea Island, medium fine, 13d.; fine, 14d.; extra fine, 15½d. per lb. Prices paid, 5½d. to 16d. per lb.

FRUIT—

GRAPE FRUIT—12/- to 14/- per box.

BANANAS—Jamaica, 4/6 to 6/- per bunch.

LIMES—4/- to 4/6 per box.

ORANGES—7/- to 8/- per case.

FUSTIC—£4 to £4 10s. per ton.

GINGER—Jamaica, 57/- to 63/- per cwt.

HONEY—Dark to good reddish, 17/- to 22/- per cwt.

ISINGLASS—West Indian lump, 1/9 to 2/3; cake, 1/1 per lb.

KOLA NUTS—4d. to 6d. per lb.

LIME JUICE—Raw, 11d. to 1/3 per gallon; concentrated, £21 per cask of 108 gallons; hand-pressed, 2/6 to 2/9 per lb. Distilled Oil, 2/6 per lb.

LOGWOOD—£4 to £4 15s.; roots, £3 10s. to £4 per ton.

MACE—Fair pale, 1/7; pale reddish, 1/5 to 1/6; fair red, 1/4; broken, 1/- to 1/3 per lb.

NITRATE OF SODA—Agricultural, £11 15s. per ton.

NUTMEGS—53's, 1/10; 64's, 1/7; 73's, 11½d.; 82's, 9½d.; 94's, 8d.; 100's, 7d.; 114's, 6d.; 128's to 149's, 5½d. per lb.

PIMENTO—Fair, 27½d. per lb.

RUM—Jamaica, 2/1; Demerara, 9½d. per proof gallon.

SUGAR—Yellow crystals, 14/9 to 15/6 per cwt., Muscovado, 13/- to 14/- per cwt.; Molasses, 10/- to 14/6 per cwt.

SULPHATE OF AMMONIA—£11 12s. 6d. per ton.

Montreal,—July 20, 1906.—Mr. J. RUSSELL MURRAY.
(In bond quotations, c. & f.)

COCOA-NUTS—Jamaica, \$26.50 to \$28.50; Trinidad, \$25.00 to \$26.00 per M.

COFFEE—Jamaica, medium, 10c. to 11c. per lb.

GINGER—Jamaica, unbleached, 14c. per lb.

MOLASCUIT—Demerara, \$1.00 per 100 lb.

MOLASSES—Barbados, 27c. to 28c.; Antigua, 22c. to 23c. per Imperial gallon.

NUTMEGS—Grenada, 110's, 18c. per lb.

PIMENTO—Jamaica, 6c. per lb.

SUGAR—Grey crystals, 96°, \$2.15 to \$2.20 per 100 lb.

—Muscovados, 89°, \$1.65 to \$1.80 per 100 lb.

—Molasses, 89°, \$1.45 to \$1.65 per 100 lb.

—Barbados, 89°, \$1.60 to \$1.85 per 100 lb.

New York,—July 27, 1906.—Messrs. GILLESPIE BROS. & Co.

CACAO—Caracas, 12½c. to 13½c.; Grenada, 11¼c. to 11½c.; Trinidad, 11¼c. to 12c.; Jamaica, 9½c. to 11c. per lb.

COCOA-NUTS—Jamaica, \$26.00 to \$27.00; Trinidad, \$25.00 to \$26.00 per M.

COFFEE—Jamaica ordinary, 8¼c.; good ordinary, 8½c. to 8¾c. per lb.

GINGER—Dark scraggy root, 10c. to 11c.; white to bright bold, 11½c. to 13½c. per lb.

GOAT SKINS—Barbados, Dominica, and Antigua, 59c.; Jamaica, 59c.; St. Kitt's, 58c. per lb.

GRAPE FRUIT—Jamaica, \$5.00 to \$7.00 per barrel; \$2.50 to \$3.50 per box.

LIMES—50c. to \$2.50 per barrel.

MACE—29c. to 33c. per lb.

NUTMEGS—West Indian, 80's, 20c.; 90's to 100's, 15½c.; 110's, 13c. to 13½c.; 130's, 11c. per lb.

ORANGES—Jamaica, \$3.75 to \$4.50 per barrel; \$1.75 to \$2.25 per box.

PIMENTO—5¼c. to 5½c. per lb.

SUGAR—Centrifugals, 96°, 3.75c. to 3.78½c.; Muscovados, 89°, 3.25c. to 3.28½c.; Molasses, 89°, 3c. to 3.03½c. per lb., duty paid.

INTER-COLONIAL MARKETS.

Barbados,—August 4, 1906.—Messrs. T. S. GARRAWAY & Co., and Messrs. JAMES A. LYNCH & Co., August 13, 1906.

ARROWROOT—St. Vincent, \$4.00 to \$4.10 per 100 lb.

CACAO—\$10.50 to \$11.25 per 100 lb.

COCOA-NUTS—\$15.00 per M. for husked nuts.

COFFEE—\$10.50 to \$11.75 per 100 lb.

HAY—\$1.00 to \$1.10 per 100 lb.

MANURES—Nitrate of soda, \$60.00; Ohlendorff's dissolved guano, \$55.00; Cotton manure, \$48.00; Cacao manure, \$45.00; Sulphate of ammonia, \$75.00; Sulphate of potash, \$67.00 per ton.

ONIONS—Bermudas, \$2.50; Madeira, \$1.51 to \$2.00 per 100 lb.

POTATOS, ENGLISH—\$3.25 per 160 lb.; Nova Scotia, \$3.25 per 160 lb.

RICE—Ballam, \$5.45 to \$6.00 per bag (190 lb.); Patna, \$3.30 to \$3.40; Rangoon, \$2.98 to \$3.00 per 100 lb.

SUGAR—No quotations.

British Guiana,—August 11, 1906.—Messrs. WIETING & RICHTER.

ARROWROOT—St. Vincent, \$8.00 per barrel.

BALATA—Venezuela block, 25c.; Demerara sheet, 38c. per lb.

CACAO—Native, 12c. to 13c. per lb.

CASSAVA STARCH—\$4.50 per barrel.

COCOA-NUTS—\$10.00 to \$12.00 per M.

COFFEE—13¼c. to 14c. per lb.

DHAL—\$4.50 per bag of 168 lb.

EDDOS—\$1.56 per barrel.

MOLASSES—15½c. per gallon.

ONIONS—Tenerife, 2c.; Madeira, 2½c. per lb.

PLANTAINS—32c. to 48c. per bunch.

POTATOS, ENGLISH—2½c. per lb.

POTATOS, SWEET—Barbados, \$1.20 per bag.

RICE—Ballam, \$5.75 per 177 lb.; Creole, \$5.50 per bag (ex store).

SPLIT PEAS—\$6.00 per bag (210 lb.).

TANNIAS—\$2.40 per barrel.

YAMS—White, \$2.40; Buck, \$3.00 per bag.

SUGAR—Dark crystals, \$2.10 to \$2.15; Yellow, \$2.30 to \$2.50; White, \$3.25 to \$3.50; Molasses, \$1.40 to \$1.60 per 100 lb. (retail).

TIMBER—Greenheart, 32c. to 55c. per cubic foot.

WALLABA SHINGLES—\$3.00, \$3.75, and \$5.25 per M.

Trinidad,—August 10, 1906.—Messrs. GORDON, GRANT & Co.

CACAO—Ordinary, \$11.75; estates, \$12.25 per fanega (110 lb.); Venezuelan, \$12.75 to \$13.00 per fanega.

COCOA-NUTS—\$20.00 per M., f.o.b.

COCOA-NUT OIL—69c. per Imperial gallon (cask included).

COPRA—\$3.85 to \$4.05 per 100 lb.

DHAL—\$4.40 to \$4.50 per 2-bushel bag.

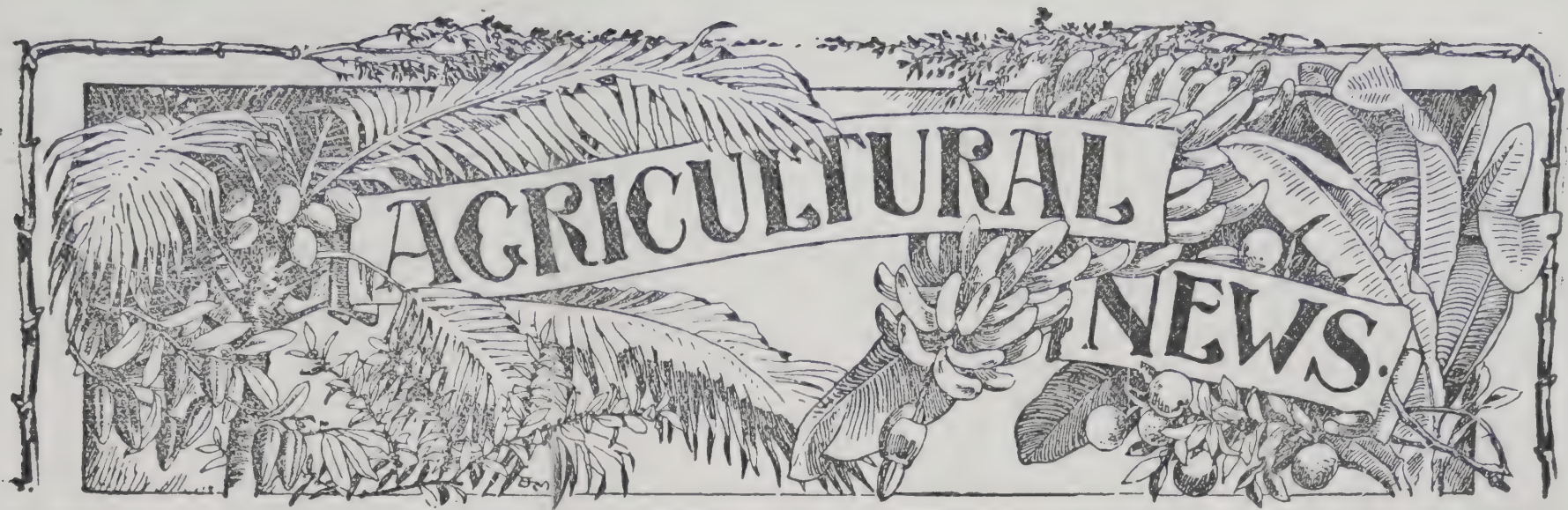
ONIONS—\$1.90 to \$2.00 per 100 lb. (retail).

POTATOS, ENGLISH—\$2.00 to \$2.25 per 100 lb.

RICE—Yellow, \$5.25 to \$5.50; White, \$5.20 to \$6.00 per bag.

SPLIT PEAS—\$5.60 to \$5.70 per bag.

SUGAR—Grocery, \$1.90 to \$2.25 per 100 lb.



A FORTNIGHTLY REVIEW
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It is estimated that during the last season some 3,300 acres were planted in cotton in the three islands, as follows: St. Kitt's, 800 acres; Nevis, 1,500 acres; and Anguilla, 1,000 acres. Of the 800 acres planted in St. Kitt's, only 200 acres were planted as a main crop, the remainder occupying the position of a 'catch crop' with canes.

The following table, giving the return of cotton exported from the presidency for the years ended December 31, 1904 and 1905, and also, for comparison, for the first quarters of 1905 and 1906, will show at a glance the progress that has been made :—

Island.	1904.	1905.	First Quarter.	
			1905.	1906.
	lb.	lb.	lb.	lb.
St. Kitt's ...	24,107	87,070	47,633	83,993
Nevis ...	28,449	144,721	47,008	56,530
Anguilla ...	1,661	31,977	17,200	71,800
Total ...	54,807	263,768	111,841	212,323

Dealing first with St. Kitt's, it may be mentioned that the system of planting cotton as a catch crop has proved very remunerative, as the greater part of the cultivation expenses are chargeable to the sugar-cane crop. As far as can be seen at the present time, the succeeding cane crop has not suffered in any way from the growth of the cotton. The land is prepared early, as for canes, the cotton being planted on the 'centres' with the first rains in June. In his report the Agricultural Superintendent sounds a note of warning in connexion with the cultivation of cotton as a catch

Cotton Industry in St. Kitt's-Nevis.

SUCH encouraging progress has been made in the establishment of the cotton industry in St. Kitt's-Nevis that it may be of interest briefly to review its position as set forth in the recently issued report on the Botanic Station and Experiment Plots in the presidency.

crop. The system renders impossible the planting of leguminous crops for purposes of green dressing; it will therefore be necessary for the planter to devote special attention to manuring.

The general prices for St. Kitt's cotton have been better than in previous years, having ranged from 1s. 2d. to 1s. 5d. per lb. of lint.

The cotton worm was troublesome, but, owing to the prompt use of Paris green, little actual damage was done. The leaf-blister mite is the most serious pest of cotton in St. Kitt's, but it was not so troublesome last year in the early stages of the plants' growth. It made its appearance when the cotton was maturing, and therefore did not cause much loss. The plants were pulled up and burned.

In Nevis the results were rather disappointing, the yield being poor in most cases. This was, no doubt, due mainly to a very dry season. The cotton worm was most persistent in its attacks, while the leaf-blister mite was also prevalent.

The prices have kept steady throughout the year at about 1s. 3d. per lb.

Encouraging reports have been received from the island of Anguilla. On some estates, where accurate returns are kept, the average yield is placed at 318 lb. of seed-cotton per acre. The average yield for the whole island, however, was probably far less. Owing to the persistent attacks of the cut worm, considerable difficulty was experienced in some cases in getting a good stand. The cotton worm, though extremely troublesome, was kept in check by the use of Paris green. The leaf-blister mite, fortunately, did not make its appearance till too late to cause any serious loss.

There are three ginneries at work in Anguilla. During the season, the Central Factory turned out 191 bales, of 200 lb. each, which included 131 bales made from 94,713 lb. of seed-cotton sent in by peasants to be ginned and shipped for them. Prices have been satisfactory, ranging from 14½d. to 17d. per lb., while one sale is reported at 18d.

Various experiments were carried out by the Department in the presidency. Those at St. Kitt's have already been reported upon in the *Agricultural News* (Vol. V, p. 231). Experiments to ascertain the best distance for planting cotton were also carried out in Nevis. In this connexion it may be mentioned that, while the average yield, over nearly 1,000 acres of land in the neighbourhood of the Nevis Experiment

Station, was less than 200 lb. of seed-cotton per acre, that on the 1½-acre experiment plot was at the rate of 1,210 lb. The best results were obtained when the cotton was planted 4 feet by 1½ feet.

It may safely be claimed that much of the success that has been met with in connexion with the establishment of this industry has been due to the zealous interest taken in it by the local officers of the Imperial Department of Agriculture.

SUGAR INDUSTRY.

Hybridization of the Sugar-cane.

The *Gardeners' Chronicle* refers as follows to a paper on the 'Hybridization of the Sugar-cane,' read by Sir Daniel Morris, K.C.M.G., D.Sc., etc., Imperial Commissioner of Agriculture for the West Indies, at the International Conference on Hybridization and Cross-breeding held in London recently:—

At one time, he said, all canes were propagated by cuttings, but in 1888 it was discovered, or rather re-discovered, that some varieties of cane produced seed. Experiments were carried out, the best canes were selected, and it might be considered that the seedling cane started from that time. The Otaheiti canes had been cultivated up to 1888, but they were attacked by a serious disease, and means had to be found to control it. The re-discovery came in just at a time when it was wanted. Had it not been for the discovery of seedling varieties, sugar-canes would practically have gone out of cultivation. During the last eight years great developments had taken place in the West Indies. The Department of Agriculture there was provided by the Government with £20,000 for its maintenance. Years ago he suggested to our own Government that a grant should be made to that department, but nothing was done until Mr. Chamberlain took the matter up. He was glad to say that they received great assistance from the United States Department, especially in connexion with the production of cotton. As to the seedling canes, they had distributed them to Cuba, Porto Rico, Mauritius, Natal, and parts of India, and everywhere the production had been enormously increased without any extra cost, owing to the cultivation of the new seedling canes. While they were increasing the output and the richness of the sugar, they were also doing much in making the canes disease-resisting. In Java and elsewhere they had been most successful in cross-fertilization by hand. In conclusion Sir Daniel read an extract from the final progress report of Professor Harrison, which stated that, owing to the Imperial grant-in-aid (which ceased to be payable from March 1906), the area occupied by new seedling varieties in British Guiana had extended from 550 acres in 1899 to 20,065 in 1906, and that, during the last five years, the new varieties of seedling canes had given, over large areas, mean results of 8, 10, 22, and 35 per cent. of sucrose higher than the average of the returns obtained from the Bourbon during the same period.

On the motion of Mr. Elwes, seconded by Sir Daniel Morris, it was decided to send a resolution thanking the U.S. Department of Agriculture for what they had done for the West Indies.

Sugar-cane Experiments in British Guiana.

A report has recently been issued by Professor J. B. Harrison, C.M.G., M.A., on behalf of the Sugar-cane Experiments' Committee of the British Guiana Board of Agriculture, on the results of the experiments with varieties of canes carried on on sugar plantations in the colony during the two crops of the year ended December 31, 1905.

The following extracts from this report are of special interest:—

Thirty-one of the plantations which have placed their results at the disposal of the Board have carried on large-scale experiments during the crops, and the following shows the number of trials with certain varieties of canes and the acreage occupied therewith during the two crops of the year 1905-6 :—

Variety.	Number of experiments reported.	Acreage occupied.	Tons of commercial sugar made.
Bourbon	37	13,701	23,859
D. 109	53	3,314	6,174
White Transparent	30	1,687	2,346
D. 625	38	1,007	2,024
B. 147	28	746	1,376
B. 208	5	583	1,539
D. 145	25	555	1,316
Sealy	13	142	251
D. 74	8	128	280
B. 109	9	60	106
D. 95	5	51	119
D. 78	3	37	48
D. 115	6	25	49
D. 117	5	19	27
D. 2,468	3	18	45

A large number of experiments with other varieties were reported, but as they were either small-scale experiments, in which each variety occupied an area less than 1 acre, or in which a variety had been experimented upon on fewer than three plantations, the results, although in many cases interesting, are not included in this report.

RELATIVE VALUES OF PLANTS AND RATOONS.

The following shows the mean returns, in tons of commercial sugar per acre, of the varieties of canes as plants and as ratoons :—

Plants.	Means, 1901-5.	Ratoons.	Means, 1901-5.
D. 625	2.45	D. 625	2.36
D. 145	2.08	D. 109	2.00
D. 109	2.08	D. 145	1.91
Sealy	2.05	B. 147	1.72
B. 147	2.00	Sealy	1.69
White Transp't. ...	1.61	White Transparent	1.48

This indicates generally that the varieties raised and selected locally are, as a rule, good ratooning canes, and that the imported Barbados varieties (Sealy, B. 147, and White Transparent) are not of equal merit with them in this respect.

The experiments indicate that many varieties of sugar-canes can be relied upon in British Guiana to give yields of sugar in quantities equal to, or greater than, those obtained from the Bourbon, and that several varieties, for instance,

D. 625, D. 145, and D. 109, possess well-marked ratooning qualities. These canes can be safely recommended to cane farmers for trial, the two former on relatively heavy lands, the latter on lighter soils. Certain varieties—D. 74, and especially D. 78 and the White Transparent—show signs of falling off in their yields, and the Committee feel that their cultivation ought not to be continued except on lands which have proved very suitable to their growth.

The means of the contents of saccharose in pounds per gallon, of the quotients of purity, of the quotients of non-sugars, and of the recovery of commercial sugars per cent. of indicated sugar in the juices of the varieties cultivated during 1901-5 are as follows :—

	Saccharose. Pounds per gallon.	Quotient of purity.	Quotient of non-sugars.	Glucose ratio.	Recovery of commercial sugar in indicated sugar. Per cent.
D. 625	1.380	80.9	12.0	9.3	82.3
D. 95	1.535	84.3	9.9	6.3	83.0
D. 145	1.456	83.3	9.4	9.0	82.4
D. 74	1.479	83.7	10.2	7.0	85.1
D. 109	1.406	83.3	9.6	8.1	82.7
B. 147	1.396	81.4	11.6	8.1	83.7
Sealy	1.452	82.7	10.7	7.9	82.8
D. 78	1.376	79.2	12.3	8.7	83.7
Bourbon	1.471	82.9	10.3	7.4	84.2
White Transp't.	1.440	83.3	9.3	7.4	84.5

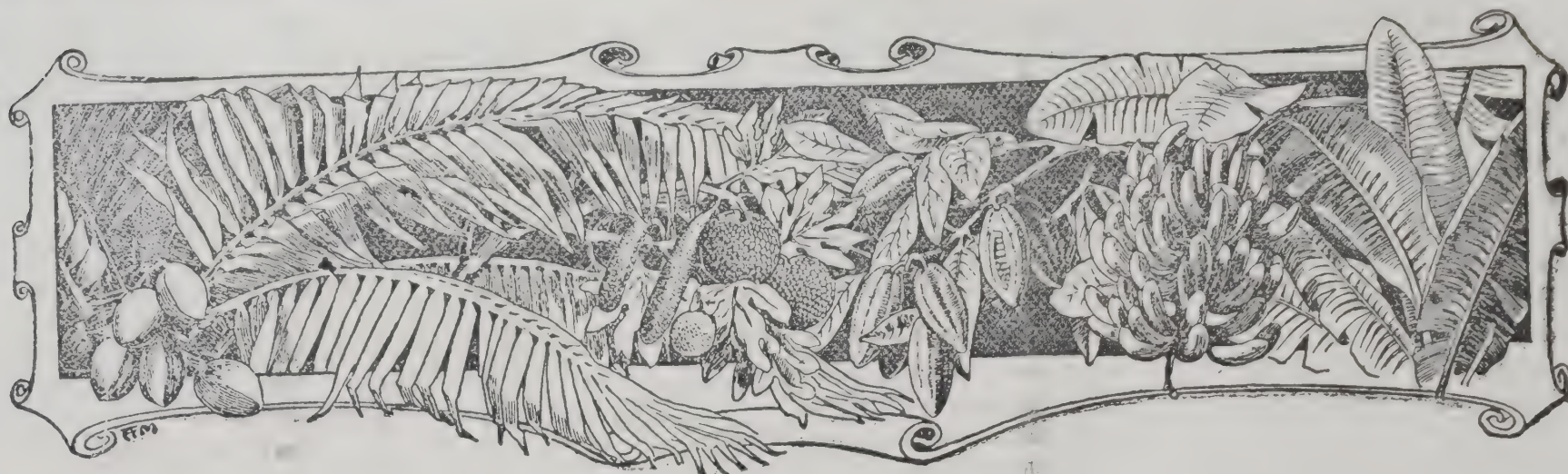
In considering these results it must be borne in mind that, in the cases of many of the experiments, the varieties of sugar-cane have been grown on land on which the Bourbon does not flourish, while the Bourbon returns are, as a rule, from land of average quality.

IMPROVEMENT OF FORESTS.

The Report of the Forest Officer in Trinidad (Mr. C. S. Rogers) for the year 1905-6 has the following brief outline of work which he regards as necessary for the improvement of the forests of the colony :—

No plantation work has been undertaken so far. It is, however, hoped that at the end of next year the demarcation will be sufficiently advanced for this most important work to be taken in hand. A scheme will then be drawn up for sanction. It is obviously essential that whatever planting is done must be carried out in a regular and systematic manner. The area to be planted up must be divided into compartments, equal in number to the years it takes for the species of trees planted to arrive at maturity ; one such compartment must be planted annually till the time for felling comes round. As soon as the first-planted compartment is felled, it must be replanted and the cycle thus completed. It can then carry on indefinitely producing a handsome revenue.

Besides the actual plantation work, much can be done to improve our forests by systematic creeper cutting, and by making small clearings to leeward of valuable timber trees—which at present form far too small a proportion of the crop—and allowing them to seed themselves in the spaces so cleared. Such work, however, must be done in a regular and systematic manner on a sanctioned scheme. The improvement of our forests by this method will be cheaper than by planting after clearing.



WEST INDIAN FRUIT.

FOOD VALUE OF NUTS.

Indian Planting and Gardening (July 14), has an article on the food value of nuts, from which the following is extracted:—

As an ideal food nuts come a good first, as they contain all the chemical elements of a perfect food. The other day we referred to the 'Bambarra Ground Nut' (*Voandzeia subterranea*), of which Balland said it was the first instance known to him of 'a natural substance possessing to an equal degree the chemical features of a complete food;' and this may with safety be said of many other nuts.

Let us see what India possesses in the way of nuts. There is first the walnut, which grows and fruits in profusion in the Himalayas. The nuts are commonly met with all over India at a very moderate price. Next we have the hazel nut, which also grows in profusion all over the Himalayas. Both of these are extremely wholesome nuts, though perhaps a trifle oily. But the proportion of proteids in both is large, and they are both capable of supporting life comfortably; while in combination with something possessing saccharine properties, such as rasins, dry figs, and apricots, we get a perfect food.

Next we have the almond and the common ground nut. Both of these are valuable; but as food, capable of sustaining life, the ground nut has the greater claim, not being quite so oily as the almond. Again, there is the very common water-lily nut, of which Europeans know little, but which is largely consumed by the natives. These nuts are very tasty and wholesome, and should be much more largely consumed by Europeans in India than they are. The pistachio nut is another valuable food, well worth cultivating.

The cashew nut tree is commonly met with on the plains of India. This nut, we consider, comes first among all Indian nuts as a complete food; and the wonder is that the tree has not been cultivated on a large scale. The nut is extremely pleasant to the taste, and quite wholesome. A little preparation is necessary to fit it for food; but the natives know what to do, the operation being simple enough.

There are some other nuts, used mostly by the natives, such as the water-nut (*Trapa natans*) and a few others; but those we have named above are well known; but they are only consumed as dessert and not as a complete food. We were almost omitting the 'Indian Almond,' the nut of *Terminalia Catappa*, which has been likened to a filbert in flavour. Firminger says it has 'the crispness of a fresh walnut: beyond comparison the most delicious of any kind the country affords.' It is one of the commonest trees of the Indian forest.

A NEW ORANGE.

Mr. D. Macgillivray, of Tobago, has written to the Imperial Commissioner of Agriculture as follows:—

I am forwarding to you by this opportunity two specimens of a new orange which I have raised on my estate Franklyns.

The tree is the result of a cross between a seedless East Indian pomelow (Labuan) and a sweet orange. I have called it the 'Sunbeam' orange, not on account of its external appearance, although that is picturesque, but on account of the unexpected sweetness of the pulp which is contained in much more delicate cells than those of the ordinary orange or shaddock. The fruits vary in shape considerably, as will be seen from the two specimens which I now send you. These two are the first picking from a second bearing. The tree bore for the first time in December last. I then sent two specimens to Mr. Hart, who pronounced the fruit similar to the 'Grenadine,' which he discovered some years ago, and which was supposed to be a cross between a shaddock and a sweet orange.

SPINELESS LIMES IN DOMINICA.

The Annual Report on the Dominica Botanic Station contains the following interesting reference to spineless limes:—

The number of spineless lime plants distributed shows a large increase over the number sent out in any previous year. Many of the trees distributed during 1902-3 are now bearing. It is estimated that there are now 12,000 plants of this type growing in the island. During the year I had the opportunity of seeing fields of spineless limes just coming into bearing in one of the windward districts. It was pointed out that this plant, when about three or four years old, owing to its erect growth, formed rather a heavy top, and was at that age more likely to be overthrown by the wind than the ordinary variety. This tendency to elongate will be corrected as the trees come into bearing; the weight of the fruit will bring the branches down, and cause the trees to assume the same habit as the common lime.

A close examination of spineless limes on several estates showed that there is no fear of the plants developing spines and reverting to the ordinary type. Plants of the intermediate variety, which have a number of blunt growths in place of the sharp spines of the ordinary lime, have been planted out and observed. In two or three years these plants have become spineless, showing that the tendency is to throw off spines and not towards developing them.

COLONIAL FRUIT SHOWS.

The following letter has been addressed by the Secretary of the West India Committee to the various Permanent Exhibition Committees in the West Indies:—

When the exhibitions of colonial fruit were first inaugurated by the Royal Horticultural Society in 1904, the principal colonies represented were the West Indies. Since then, however, interest has fallen off to such an extent that at the last exhibition, held on June 5 and 6 last, the West Indies sent no exhibits direct, and were only represented by firms at home, though such distant colonies as Australia and South Africa made very representative displays, the former of citrus fruits, which are likely to compete keenly with similar fruits from the West Indies. I think that you will agree with me that this lack of interest is a pity, more especially as these exhibitions are well attended and 'noticed' by the press.

Everything is made as easy as possible for exhibitors; space is free of charge, and exhibits are brought over freight free through the kindness of the Royal Mail Steam Packet Company. In the circumstances, I venture to ask for your kind assistance towards securing the more adequate representation of the West Indies in the future.

The next exhibition of the series is to be held on December 4 and 5 next, and it has occurred to me that this would be a good opportunity for following the example of Cape Colony, whose Government hired the whole of the hall for the night preceding the exhibition in March last and gave a reception to which the press and those interested in fruit were invited, thus securing a very excellent advertisement for her produce.

I believe so implicitly in these exhibitions, that I have already engaged the Horticultural Hall, with cloak-room and storage accommodation, for the purpose of an evening reception, at a cost of £7 17s. 6d., including heat and light, feeling that, with your valuable co-operation, it should be possible to get together a collection of fruit sufficiently representative in quantity and quality to make it worth while doing so. What I have done may at first seem premature, but as the matter was under consideration by another colony, it was desirable, and, indeed, necessary to take immediate action.

With regard to expenses, it would be a case of cutting our coat according to the cloth. The expenses would be for (1) the hire of the hall; (2) carriage of the fruit from port of arrival; (3) assistance for setting out the fruit on tables provided free of charge; (4) the reception. The latter would, of course, be controlled by the number of people invited, but I think myself that at least 1,000 invitations should be sent out. At any rate, if the colonies could provide among them the sum of from £80 to £90, we should not have to ask them for more, but should, I estimate, be able to show a balance on the right side.

As regards my own position in the matter, I need hardly say that I shall be only too glad to assist in making the arrangements if I can secure your valued co-operation. I trust that you will give this matter your consideration, and favour me with a reply at your early convenience, as time is of object.

Readers of the *Agricultural News* are, no doubt, fully aware of the importance attached by the Imperial Department of Agriculture to the desirability of securing the adequate representation of the various West Indian industries at these exhibitions. It is hoped that the Permanent Exhibition Committees will take this matter up and give every assistance.

COCOA-NUTS IN NEW GUINEA.

In *Australia To-day*, a special issue of the *Australasian Traveller*, of December 15, 1905, containing valuable information for the use of intending settlers and others, the following account is given of the cultivation of cocoa-nuts in New Guinea:—

Great attention is now being paid to the cultivation of cocoa-nuts. Copra, as the commercial product of the cocoa-nut palm is called, is a highly profitable article. From it cocoa-nut oil is extracted, and oil-cake, which forms a most excellent cattle food, is made. Although the product has, at times, been subject to variations in price, the history of the last few years has shown that the demand for it is steadily increasing, and in many parts of the South Seas large areas have been, and are being, placed under cultivation.

The cocoa-nut palm, which supplies so many wants of the natives that it is almost possible to maintain existence by it alone, will grow on any part of the coast line of New Guinea, and to some short distance inland. It will grow on soil which is but little better than the shifting sea sand, but of course higher results are obtained where planting is carried on in land of superior quality, though really first-class land is not the best for the purpose. Little labour is necessary after the palms are planted. All that is required is to keep the ground clean and wait till the trees arrive at maturity. This they do in periods varying, according to the situation of the plantation, from five to ten years. A certain amount of capital, therefore, is necessary to enable the intending cocoa-nut grower to wait until his trees are in full bearing. The gathering of the crop can be performed by men without any preliminary training, and the extracting and drying of the fruit from the husk-covered shell is a work presenting no difficulty. Hitherto, owing to the cheapness of labour, this work has not been carried out by machinery, but experts consider that it would not be impossible to devise a machine which would be capable of doing what is necessary.

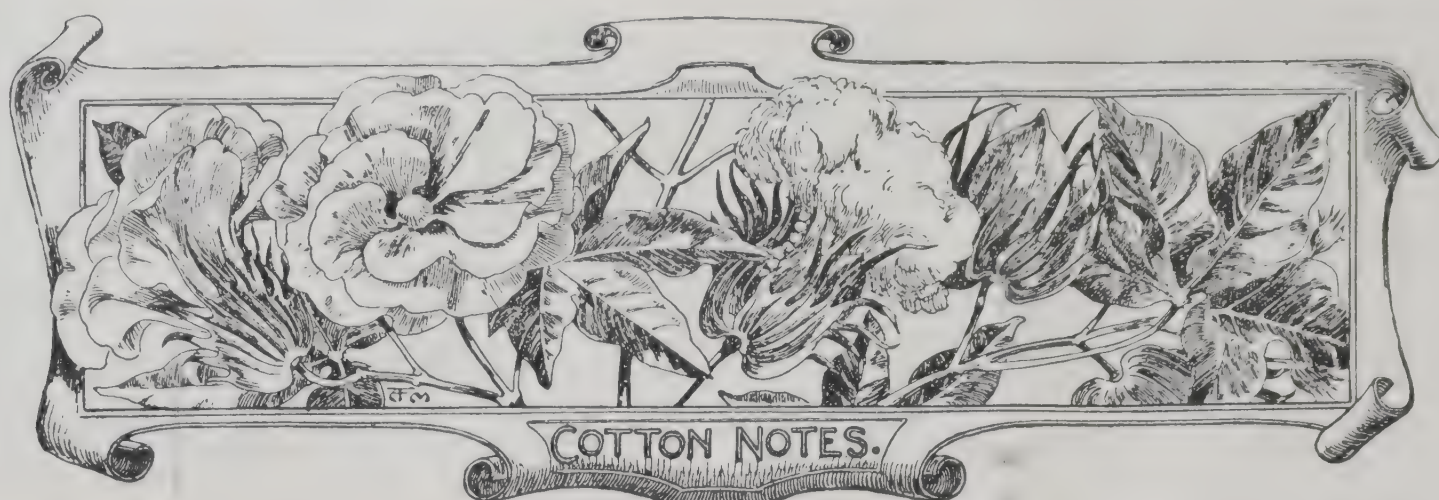
COPRA.

The practice at present is to send the copra to Sydney or Melbourne, where it finds a constant market; but should the cultivation of the product materially increase, an opening might exist for a local oil-mill, and so save a large portion of the freights which, owing to the bulky nature of the article in proportion to its weight, are comparatively heavy.

There are upwards of sixty varieties of cocoa-nuts known, and care should be taken to select those which bear fruit in the greatest number, and of the best oil-producing quality. They should be planted about 25 to 33 feet apart, and where the climate is at all dry, should be sunk in pits 3 or 4 feet deep, which will serve to retain the moisture. Some 5,000 to 10,000 nuts, according to the size, are requisite for the production of 1 ton of copra. It is calculated in the South Pacific that a cocoa-nut palm in full bearing is worth about 4s. per year. This would give a return of about £14 per acre.

There is at present a good deal of Government land available for leasing for cocoa-nut plantations, on the following easy terms: Period of lease, sixty years; rent for the first five years free, for the second five years, 6d. per acre; for the balance of the term, 1s. per acre; the only important condition being that at least half the area leased shall be planted in cocoa-nuts within the first five years.

It has been already stated that a cocoa-nut planter requires sufficient capital to tide him over the non-productive period, but there are other more quickly maturing products, such as cotton, maize, and sisal hemp, which may help him through the period of waiting for the full returns from his palms.



WEST INDIAN COTTON.

Messrs. Wolstenholme & Holland, of Liverpool, report as follows, under date of August 14, in regard to West Indian cotton:—

We have to report quiet markets for West Indian Sea Island descriptions during the past fortnight, without material change in prices.

Sales have been on a retail scale, and include Barbados, 15*d.* to 15½*d.*; St. Kitt's, 15*d.* to 15½*d.*; and Antigua (stained) at 7¼*d.*

EXPORTS OF COTTON FROM THE WEST INDIES.

The following is a statement (furnished by the Customs Department in each case) showing the amount and estimated value of Sea Island cotton exported from the various West India Islands during the quarter ended June 30, 1906:—

Island.	Bales.	Weight in pounds.	Estimated value.
Barbados ...	265	117,243	£5,862
St. Vincent ...	246*	75,633	3,782
Antigua ...	158	31,600	1,580
Montserrat ...	14	5,448	272
Grenada			
(Marie Galante)	673½	207,948	4,465
Tobago ...		7,082	177
British Guiana			
St. Lucia ...	2	600	30
St. Kitt's ...	63	24,155	1,208
Nevis ...	247	55,241	2,762
Anguilla ...	34	6,800	340
Virgin Islands	33†	6,975	349
Total ...	1,735½	538,725	£20,827

* 144 bags.

† 3 bags.

No returns have been received from British Guiana or Jamaica.

Similar returns for the quarter ended March 31, 1906, were published in the *Agricultural News*, Vol. V, p. 214.

The total exports for the half-year have been 1,325,291 lb., of the estimated value of £57,195. For the corresponding period of 1905 the exports were 899,625 lb., of the value of £36,915.

ANTIGUA COTTON FACTORY.

The following information is extracted from a report, prepared by the Hon. Dr. F. Watts, C.M.G., on the working of the Antigua Cotton Factory for the past season, up to July 20:—

The work of the ginnery has almost been completed; 483 bales have already been ginned, but it is possible that some 8 or 10 more may be forthcoming before the ginnery closes. The bales are of 200 lb. net, except that towards the end of the crop, when closing affairs, a few bales of odd weights are produced.

The expenses incurred for the whole of the season, to July 20, amounted to £251 13s. 2*d.* The revenue from January 1, 1906, to end of crop 1906 was £508 5s. 9*d.*

COTTON PLANTING IN ST. VINCENT.

Mr. W. N. Sands, Agricultural Superintendent, has forwarded, under date August 17, the following information in regard to the prospects of the cotton crop in St. Vincent:—

The estates generally have extended their cultivations, and a much larger acreage than last season has been planted.

A large number of small growers have also taken up the industry.

The total area planted is estimated at nearly double that of last season, say, 1,400 acres.

The young plants, in most cases, are growing well and free from disease, although the rainfall of June at the Botanic Station was 16.88 inches; in July, 13.44 inches; and during the present month, to date, 10.52 inches.

On some estates washes occurred, but I have not heard of any serious damage.

The root borer of the sugar-cane and the mole-cricket did some injury to young plants on one or two estates, as also did a small leaf-eating beetle, but the attacks passed off as the plants reached a certain size.

Given fair weather conditions, the crop should surpass all previous ones.

COTTON GROWING IN ST. CROIX.

The *St. Croix Avis*, of July 28, has the following note on cotton growing in that island:—

Cotton growing continues to attract a good deal of attention and is extending. The broad expanse put in by the Plantation Company gives to the south side of the East End, formerly covered by worthless bush, a picturesque aspect, speaking of industry and prosperity. Yesterday we saw several large pieces at Solitude covered with young cotton plants, and the proprietor is still clearing land.

According to the Barbados experts, the best time of sowing is from May to August, so that we shall shortly be at the end of the most advantageous period; but a planter told us recently that he had found a piece planted in October last year give very good results. A good deal depends, of course, on the weather. Last year the rains were late, and consequently were well timed for the late planting, we cannot count on the same this year; at all events it seems that those who have cotton experiments in hand should push on the work now as fast as possible.

A profit of over \$40 an acre, such as was recorded by Mr. Stakemann last year, is a strong argument for a trial; though, on the other hand, cane planters may prefer not to take any risk, but to stand by their old friend in the hope of an improvement in the future.

COTTON GROWING IN PORTO RICO.

The *Consular Report* on the trade of Porto Rico has the following note on the cotton industry :—

The favourable reception accorded the 1904 crop of cotton was responsible for an increased acreage of planting in 1905, but the results have been discouraging.

The crop proved inferior in quality and weak in fibre, owing, it is said, to the use of unsuitable new lands, want of fertilizer in the old holdings, and withal general inexpert handling.

Raw cotton to the value of £34,425, and £4,928 of seed, are reported to have been exported during the year to the United States, the greater part of which was in transit to Liverpool.

There are about 6,000 acres devoted to cotton planting in the island at the present date, but this area is not likely to increase, for although experiment has shown that suitable land can be had for about £8 per acre capable of producing from 1,200 lb. to 1,700 lb. per acre of Sea Island cotton, spare land of any real worth finds more remunerative employment in raising cane for the various new sugar centrals springing up all round.

COTTON EXPERIMENTS IN ANTIGUA.

The following experiments with cotton will be undertaken in Antigua during the present crop :—

1. Plots to be planted with 'Rivers' seed, Gilbert's seed, and Centreville seed; these plots to be used for seed selection, comparison of yields, and distance of planting.
2. Plots to be laid out with 'graded' seed, which has given lint of known length, the crop from each grade being kept separate so as to permit of the selection of the best grade from each plot for successive experiments.
3. A small plot to be artificially infected with leaf-blister mite and controlled by (a) hand picking and (b) sulphur and lime.
4. Experiments will be made to test the relative merits of Paris green, London purple, green arsenoid, and Scheele green in destroying caterpillars.
5. Experiments will be made with the cross-fertilized seed obtained in last year's experiments.
6. A series of experiments is planned on the disinfection of cotton seed, under various conditions, and with various disinfectants, germination tests being made on the disinfected seed.

PRODUCTION AND PRICES OF COTTON.

The following tables show the variation in the supply and prices of cotton during the past twenty years. They have been kindly prepared by Messrs. Wolstenholme & Holland, of Liverpool:—

SUPPLY OF COTTON.

1891-2	1890-1	1889-90	1888-9	1887-8	1886-7	1885-6	1898-9	1897-8	1896-7	1895-6	1894-5	1893-4	1892-3	1904-5	1903-4	1902-3	1901-2	1900-1	1899-1900
11,370	16,275	9,241	9,607	8,561	8,735	7,010	5,638	10,201	10,700	9,990	5,893	2,578	7,276	12,242	9,549	12,635	8,641	8,377	7,810
47,750	51,851	37,638	34,536	30,918	36,402	30,662	40,937	41,599	64,909	61,312	53,703	58,474	38,171	51,922	39,298	67,005	53,009	54,974	60,921
59,120	68,126	46,879	44,143	39,479	45,137	37,672	21,189	24,973	26,361	20,771	15,031	—	—	38,026	27,562	26,280	22,770	25,374	29,607
							67,764	76,783	103,970	92,718	74,627	61,052	45,447	102,190	76,409	105,920	84,420	88,725	98,338
Island	Island	Island	Island	Island	Island	Island	Georgia	Georgia	Georgia	Georgia	Georgia	Georgia	Georgia	Island	Island	Island	Island	Island	Island
Georgia	Georgia	Georgia	Georgia	Georgia	Georgia	Georgia	Florida	Florida	Florida	Florida	Florida	Florida	Florida	Georgia	Georgia	Georgia	Georgia	Georgia	Georgia
Florida	Florida	Florida	Florida	Florida	Florida	Florida	Texas	Texas	Texas	Texas	Texas	Texas	Texas	Florida	Florida	Florida	Florida	Florida	Florida

PRICES.

	'Fine Island.'	'Fancy' or 'Extra Fine Florida.'
Jan. 1, 1886 ...	18 d.	15½ d.
" 1887 ...	15½ "	13 "
" 1888 ...	16 "	13½ "
" 1889 ...	16½ "	14 "
" 1890 ...	17 "	14½ "
" 1891 ...	14 "	11½ "
" 1892 ...	13 "	10 "
" 1893 ...	18 "	14 "
" 1894 ...	19 "	12 "
" 1895 ...	14½ "	10 "
" 1896 ...	15 "	10½ "
" 1897 ...	13 "	10 "
" 1898 ...	11½ "	10 "
" 1899 ...	11½ "	9½ "
" 1900 ...	11½ "	9½ "
" 1901 ...	13½ "	13 "
" 1902 ...	13 "	12½ "
" 1903 ...	13 "	12 "
" 1904 ...	15 "	13½ "
" 1905 ...	15 "	12½ "
" 1906 ...	14 "	11½ "

EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming, should be addressed to the Commissioner, Imperial Department of Agriculture, Barbados.

All applications for copies of the 'Agricultural News' should be addressed to the Agents, and not to the Department.

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Agricultural News

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NOTES AND COMMENTS.

Contents of Present Issue.

The editorial in this issue deals with the progress of the cotton industry in St. Kitt's-Nevis.

A short note on a paper read at the International Conference on Hybridization and Cross-breeding, by Sir Daniel Morris (see p. 274) briefly reviews the efforts that have been made in the West Indies to improve the sugar-cane.

Extracts from a recent report on sugar-cane experiments in British Guiana appear on p. 275.

It is desired to draw the attention of readers of the *Agricultural News* to the letter from the Secretary of the West India Committee, published on p. 277, relative to the representation of the West Indies at the forthcoming show of colonial fruit to be held under the auspices of the Royal Horticultural Society.

On pp. 278-9 will be found several notes of interest to cotton growers. The prospects of the cotton crop in Antigua and St. Vincent are reported upon, and references made to cotton growing in Porto Rico and St. Croix. Interest also attaches to the tables dealing with the production and prices of cotton during the past twenty years, and to the returns of cotton exported from the various West India Islands during the quarter ended June 30 last.

The leaflet reproduced on p. 282 shows what steps are necessary to secure the eradication of the tick nuisance. Stock raisers in the West Indies will be well advised in adopting some such system as that advocated in the leaflet.

Exports of Barbados.

According to the *Blue Book* on Barbados for the year 1905-6, the value of the exports of produce and manufactures of the island during the year amounted to £696,829.

The exports of sugar were as follows: muscovado, 45,469 hhds.; dry sugar, 1,628 hhds. The total value of the sugar exports was £451,491. Of molasses 39,379 puncheons, of the value of £177,205, were exported.

Other articles of export were: arrowroot (487,191 lb.), £3,775; cotton (344,232 lb.), £17,211; fruit (including bananas), £11,803; manjak (929 tons), £9,292.

Balata and Rubber in British Guiana.

According to the Annual Report on the North-Western district of British Guiana, balata bleeding is on the increase. It is estimated that there are some 150 bleeders at work, and large shipments may, in consequence, be looked for.

The rubber industry has come to the front very much during the year, and prospectors are coming into the district to ascertain whether rubber can be found in paying quantities. A large number of young rubber plants are reported to be growing splendidly.

Grants of Crown lands up to 9,305 acres have been made during the year.

Rice Growing in British Guiana.

The Demerara *Argosy* (August 18) has a short article reviewing a recent report by Mr. A. L. Mansfield, Agricultural Instructor, on a visit to Leguan in March last in connexion with the rice industry in the island.

'Excellent returns were obtained from the foreshore last year, 40 bags to the acre being realized. . . At the time of the Instructor's visit there were 420 acres in course of preparation for the May sowing.'

The island has two rice mills in operation, and it is expected that the area under rice cultivation this year will reach 2,000 acres, or double last year's acreage. The crop last year amounted to 35,000 bags.

An important point in connexion with the industry is that the negroes are following the example of the coolies in planting rice.

Sugar-cane Experiments in British Guiana.

From the extracts published on p. 275 it will be seen that the experiments which have been carried out by the Board of Agriculture in British Guiana comprise trials of a large number of varieties of canes.

Many of these varieties have been proved to give yields equal to, or greater than, those obtained from the Bourbon. D. 625, D. 145, D. 109, which have also exhibited well-marked ratooning qualities, are recommended for further trial.

D. 74, D. 78, and the White Transparent have shown signs of falling off in their yields, and the committee advises that their cultivation be continued only on lands which have proved very suitable to their growth.

Exports of Dominica.

The *West India Committee Circular* (August 8) publishes tables showing the exports from Dominica during the years 1904 and 1905. The tables are of considerable interest as showing the progress being made by this prosperous island.

The total value of the exports during 1905 was £78,035, as compared with £63,006 in 1904, or an increase of £15,029. There appears to be an increasing tendency to ship the products of the island to the United States.

Practically all the principal exports participate in the increase. The value of the output of cacao rose from £21,325 to £25,554; that of lime products from £28,986 to £38,901. Green limes were responsible for an increase of £1,890. There was a decrease in the output of raw lime juice, but a large increase in the concentrated product.

Tobacco in the Bahamas.

The *Bulletin of the Agricultural Department*, Bahamas, for July, contains an article by the Curator on tobacco culture at the Experiment Station.

The results of the experiment show that a very fine grade of tobacco can be grown and cured in the Bahamas. The reports from local cigar manufacturers who examined the leaf were very satisfactory as regards both cultivation and curing.

It is suggested that tobacco growing will prove a lucrative industry.

The seed used was obtained from Havana, $\frac{1}{4}$ acre being planted with it. This resulted in a crop of 195 lb. of 'carpa' wrapper or binder, 111 lb. of 'tripa' filler, and 1 lb. of 'fongue,' or at the rate of 1,228 lb. per acre.

One of the local manufacturers pronounced these leaves to be 'equally large, and the quality as good, as those I generally import from Havana, Cuba.'

Cotton Industry in the Virgin Islands.

With a view to encouraging the cultivation of cotton in the Virgin Islands, and in view of the fact that there is no person who could undertake the work, arrangements have been made by which the cotton grown by the peasantry is bought at the Experiment Station, where it is ginned and shipped to England. It was very desirable that the growers in the Virgin Islands should have a ready-cash market.

From August 1, 1905, to May 31, 1906, the sum of £147 14s. 11d. was paid for seed-cotton. At the end of May 6,975 lb. of clean lint had been shipped; this was valued at £205, the cotton being of only medium quality. These returns show an increase of 14 bales over last year's shipments. Some headway is being made, though slowly. The Agricultural Instructor finds it difficult to get the growers to realize that only the very best qualities of cotton fetch high prices, and that great care is necessary in producing first-rate cotton.

Cane Farming.

His Excellency Sir Henry Jackson, Governor of Trinidad, has circulated among sugar estate proprietors in Trinidad some notes on the cane-farming systems of Fiji, Mauritius, and Hawaii.

With a view to meeting the scarcity of the labour supply in Trinidad, it is desirable to induce the East Indian immigrants to remain on the estates. Means of securing this have been successfully devised elsewhere by the share system, as worked by cane companies in the countries mentioned.

In Fiji the land is divided into blocks of 60 acres, prepared and planted by the estate, and then handed over to cane companies, composed of free or indentured labourers, which carry on the cultivation under the supervision of the estate's management. An advance of 1s. is made to the members of the cane company for every day of nine hours worked. When the canes are cut and taken to the mill, the cane company is credited with the amount per ton agreed upon beforehand, and from this are deducted the advances made during cultivation and the cost of any work done by the estate after handling. The actual payments to the cane companies work out at from 2s. to 3s. per head per day.

This system has had the effect of inducing the indentured labourers to remain on the estates after their agreements have expired, and Sir Henry Jackson is of opinion that some such system would be advantageous in Trinidad.

Insects and Diseases.

In his inaugural address at the York meeting of the British Association, Professor Ray Lankester, F.R.S., mentioned that another feature of the progress of our knowledge of disease was the recent recognition that minute animal parasites were the causes of serious and ravaging diseases, and that the bacteria were not alone in possession of this field of activity.

Major Ross had discovered that the malarial parasite passed a part of its life in the anopheles mosquito, not, as he had first supposed, in the culex, and that malaria could be lessened if these mosquitos were got rid of, or if they could be prevented from sucking the blood of malaria patients.

Following this great discovery, Colonel David Bruce had proved that the tse-tse fly conveyed by its bite the trypanosome, which produced the deadly 'Nagana' horse and cattle disease in South Africa, from wild big-game animals to the horses and cattle of the colonists. Colonel Bruce had also shown that the big-game were tolerant of the parasites, while the introduced animals were poisoned by the chemical excreta of the trypanosomes. Another species of trypanosome, also carried by a tse-tse fly, had been proved by Colonel Bruce to be the cause of sleeping sickness in Uganda. Trypanosomes were now being recognized in the most diverse regions of the world as the cause of disease. In all such cases a knowledge of the carrier of the disease was extremely important, as well as the knowledge of the reservoir-hosts, when such exist.

HOW TO GET RID OF CATTLE TICKS.

The following circular has been issued by the Bureau of Animal Industry of the U. S. Department of Agriculture. In his letter of transmittal the Chief of the Bureau writes as follows:—

‘If the southern farmers will but make a united effort along the lines indicated and thus co-operate with the local officials and this Bureau in attacking the tick problem, much headway will be made, and our ultimate aim—namely, the entire eradication of the tick and its direful consequences to southern agriculture—will be within measurable distance of accomplishment.’

The destruction of ticks which are on cattle and premises is the first step in procuring a free cattle traffic. The following suggestions are therefore made for the purpose of assisting owners of small numbers of ticky cattle to get rid of the fever ticks:—

The term ‘ticks’ as here used is especially applied to the fever tick (*Boophilus annulatus*). These ticks are the more abundant in the latter part of summer and fall, the other kinds being rarely present after the month of July. All ticks are harmful, however, and should be destroyed.

The term ‘cattle’ should be understood to include all cows, steers, bulls, heifers, yearlings, calves, and oxen.

Tick-free premises are those in which there have been no ticky animals for nine months previously.

THE HAND PICKING AND GREASING METHOD.

Cattle and premises may be freed from ticks by hand picking the cattle even though they are allowed to run on ticky premises, provided they are controlled and no other animals are permitted on the premises. The method of hand picking and greasing is most suitable in cases where there are but few animals, or for small herds where the conditions for grazing cannot be changed. The method consists in carefully examining all the cattle daily and picking or scraping off the ticks. In this connexion it must be remembered that horses and mules sometimes carry ticks, and therefore these animals must also be thoroughly and frequently examined and the ticks removed. The greatest care must be exercised to collect and destroy all of the ticks removed. It is true that while this process is going on the animals will get more ticks on them if the premises are ticky, but by diligently destroying all the larger ticks the supply finally gives out on account of the seed ticks having perished.

Arrange to examine all the cattle and pick the ticks at least every other day. All parts of the animals, especially the insides and back parts of the thighs, should be examined for ticks. If any of the cattle are difficult to handle, they should be driven into a chute or narrow pen made for the purpose, and where good light is afforded. Ticks can be seen best in sunlight. Ticks must not be thrown on the ground, but should be placed in tin cans or other convenient vessels, and carried to a suitable place and burned or otherwise totally destroyed, or they will lay eggs, and seed ticks will hatch in countless numbers. *Begin now to pick ticks, and be sure that not a single tick matures on your cattle after September 1.* As a result of your trouble in observing the precautions herein indicated during this summer and fall, the cattle and premises should be free from ticks by April 1.

To assist in preventing ticks from getting on cattle, the cattle may be greased at the time of picking or as often as may seem to be necessary. The greasy solution is obnoxious to the ticks, and if the legs and sides of the animals are

treated in this manner, the ticks will be less apt to crawl on them.

In greasing cattle, use Beaumont crude petroleum or any crude oil, cotton-seed oil, fish oil, or lard. The following mixture will be found useful for this purpose: One gallon of kerosene, 1 gallon of cotton-seed oil, and 1 lb. of flowers of sulphur. Any of the above may be applied with a sponge, swab, or brush, and should be thoroughly rubbed on all the lower parts of the cattle, and at least halfway up their bodies.

THE TIE-ROPE OR PICKETING METHOD.

This method is practicable where there are only a few head of cattle. It consists merely in picketing the cattle out on tick-free pasturage. The cattle must be occasionally moved, and the places where they have been must be carefully avoided for some nine months thereafter.

THE TWO-FIELD METHOD.

On or before September 1, remove all cattle (including your stock and calves) from the pasture or range where they are to be kept after March 15 of the following year. Do not permit any cattle, horses, or mules on such pasture or range during the period indicated. If the premises in which the cattle are placed during this period adjoin the pasture or range where they are to be kept after March 15, it will be necessary to set the dividing fence over some 10 or 20 feet on the pasture at the time of changing the cattle in March. *Be sure to examine every head of cattle carefully for ticks before changing them in March.* If ticks are present on the cattle at this time and are not destroyed, the pasture will become infected, and the work will have to be done over again. If the ticks are frequently removed by picking, and the cattle are greased immediately after they are taken from the pasture in September, the danger of future infection will be greatly lessened.

CONCLUSION.

Any of the above methods may be followed from mid-summer until the following April.

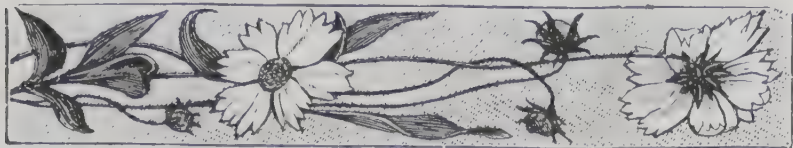
Select the method best suited to your conditions and carry it out vigorously. Help your neighbour to do the same.

Be sure that no other cattle pass over the premises where your cattle go, unless the other cattle are kept free of ticks.

Do not let a single tick mature after September 1.

If every one will do his part in getting rid of ticks, the cattle quarantine will be removed.

Tobacco Dust as an Insecticide. Tobacco dust (the waste product of tobacco factories) is especially valuable as a fertilizer and insecticide for pine-apples, and it is the only safe article that can be used for dropping in the bud or heart of the plants; my plan is to go over the pine-apple fields, after the suckers or slips have been planted four or five weeks, and drop about a good pinch or two tea-spoonfuls into the heart of each plant; this acts as a splendid stimulant and kills the mealy bug and discourages ants from building their nests at the base of the plants, and whilst it will not kill ants, it will eventually drive them away for the want of mealy bugs to feed upon. The potash and ammonia contained in the dust will stimulate the plants and force them to make a vigorous growth and keep them free from insects and in a healthy condition. (Mr. G. L. Lucas in the *Bulletin of the Department of Agriculture, Jamaica.*)



CURING SKINS.

In reply to inquiries from correspondents, the editor of the *Journal of the Jamaica Agricultural Society* publishes the following directions for the curing of skins:—

CURING GOATS' SKINS.

The following recipe is for curing rabbit and goat skins. First soak the skins in cold water until soft (if just taken off they will not need soaking), then scrape the flesh and grease off. This can be done over a half-round post. Set one end on the ground, and have the other as high as the hips. Place the skin over the post so as to lean against the end of the post, and hold the neck of the skin. In place of a breem knife a long carving knife can be used by winding a cloth on the point, so that both ends can be held to scrape the skin with the middle of the knife. Next make a liquor by dissolving 1 lb. of alum and 1 lb. of salt together in 2 or 3 gallons of water. Set the liquor to cool and put the skins in. Stir them so that the liquor reaches all parts of the skins, and let them remain in the liquor from six to ten days, or longer, if in no hurry for the skins. Then dry them in a cool place. Dampen them by hanging up in a cellar overnight, and then stretch them out. This can be done over a spade turned handle down. (Or a stretcher can be made by nailing a piece of $1\frac{1}{2}$ -inch plank, $2\frac{1}{2}$ inches long by 8 inches wide, in the centre of a 2-inch plank, 10 inches wide by 3 feet long, in the form of a 'T,' and sawing a slit in the top of the upright piece, and fitting in a piece of iron or an old hoe blade.) To clean the fur, put 6 or 8 inches of hard-wood saw-dust (the finer the better) into the bottom of a barrel, and put the skins in, putting more saw-dust among and over them; then stand in the barrel and tread them until the fur is clean. The liquor will keep a long time, and as used can be renewed by adding alum and salt. Take of saltpetre, 1 part; salt, 2 parts; alum, 2 parts; pulverize finely and mix thoroughly. From the skins remove all flesh parts; if they have been dried, you must soak them in water to soften them. Then give the skins a thin coating of the mixture, turn the sides in, roll them up, and lay them aside for a few days. The thicker the skins the longer they must lie. A little practice will be the better teacher in this. Now take them and rinse thoroughly, remove all the mixture; wring them out, well rubbing them between the hands, and pulling them in every direction until perfectly dry. By following the above directions you will have skins as soft as velvet. The more you rub and pull them the softer they will be.

PREPARING SHEEP SKINS.

The fresh skin should be laid out, skin up, on the floor for a few hours to set, and then be hung up to be painted. The preservative recommended is 1 lb. of common soda, $2\frac{1}{2}$ lb. of arsenic, boiled gently for four hours in $3\frac{1}{2}$ gallons of water, stirred frequently. To treat a skin, use 1 pint of this mixture and add 3 pints of water, which would be enough for 350 skins. This mixture keeps indefinitely in an earthenware or glass jar. A few days after painting, the skins should be examined, and any parts missed should be painted. A skin treated thus would keep for twelve months free of weevils. To dry a skin, hang it from neck to tail, and in baling, turn the wool side out, folding in half. In tying bales there should be strips of wood, top and bottom, to prevent the pressure of the wire or rope chafing the skin and reducing the value of the bale.

RUBBER IN PERU.

An article entitled 'Peru in Transition,' by Mr. C. Reginald Enock, F.R.G.S., in *The Times* (July 30), has the following on rubber:—

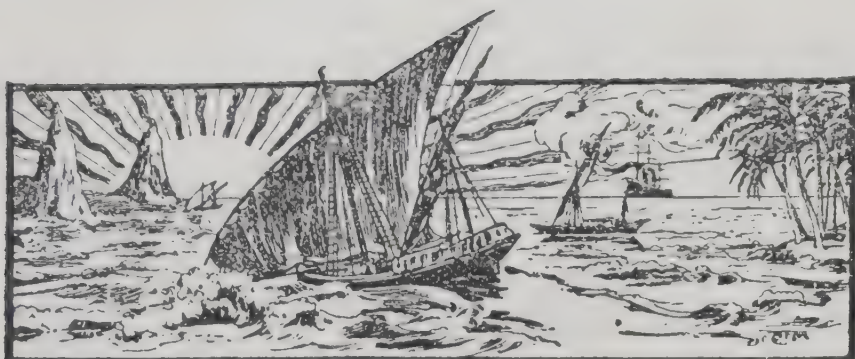
India rubber is one of the most valuable of the vegetable products of Peru; and, in fact, a great deal of the rubber shipped from Para, in Brazil, actually comes from the Peruvian forests of the Upper Amazon and its tributaries. The cheapest outlet for this product is not necessarily down the Amazon to Para; much is now being shipped over the Andes by means of the Arequipa railway to the Pacific coast port of Mollendo, and thence to Europe or the United States. By this means duties and costs of transport through Brazil are avoided. If Peruvian rubber forests have not yet attracted much foreign capital, this has been from lack of knowledge abroad of the conditions. Concessions for rubber lands are given by the Peruvian Government on more favourable terms than those of Brazil, while the export duties from Peruvian ports are much less than those charged by both Brazil and Bolivia. There is an unlimited field in Peru for enterprise in rubber production, a field certainly no less attractive or profitable than those which are at present so largely occupying the attention of capitalists in other parts of the world.

SUPPLY OF RUBBER.

In his address as President of the chemical section of the British Association at York, Professor Wyndham Dunstan made the following reference to the production of rubber:—

There is no more important group of questions demanding attention from the chemist at the present time than those connected with the production of India rubber or caoutchouc. An enormous increase in the demand for India rubber has taken place in the last few years, and last year the production was not less than 60,000 tons. Until recently the supply of rubber came chiefly from two sources—the forests of Brazil, which contain the tree known as *Hevea brasiliensis*, furnishing the Para rubber of commerce, which commands the highest price, and the forests of Africa, where climbing plants, generally of the Landolphia class, also furnish rubber. The increased demand for caoutchouc has led to the extensive planting of the Para rubber tree, especially in Ceylon and in the Federated Malay States. Systematic cultivation and improved methods of preparation are responsible for the fact that the product of the cultivated tree, which begins to furnish satisfactory rubber when six or seven years old, is now commanding a higher price than the product of the wild tree in Brazil. It is estimated that within the next seven years the exports of cultivated India rubber from Ceylon and the Federated Malay States will reach between £10,000,000 and £15,000,000 annually, and that after fifteen years they may exceed the exports of the so-called wild rubber from Brazil.

The Litchi (*Nephelium Litchi*), introduced from Guadeloupe and presented to the gardens during 1898 by the Hon. S. R. Pemberton, flowered and fruited for the first time in Dominica. Seed of the Litchi was received from Trinidad during 1904, from which plants were raised and distributed about the island. A few plants were also obtained from the established tree by propagation by circumposition. If the tree can be well established in Dominica and be got to fruit regularly, it would prove a desirable addition to our list of fruits. (Annual Report on the Botanic Station, Dominica.)



GLEANINGS.

The Agricultural Instructor in St. Lucia reports that the cacao crop is very forward on clay lands, and backward on lighter soils; on the whole, it promises to be a fair crop, but not a record one.

According to the *Consular Report* on Surinam, the prices of balata continued low during 1905, and the amount collected was only 244 tons, against 260 and 370 tons in the two previous years. The value of the year's export of balata was £34,630.

The Curator of the Botanic Station at Montserrat states that 1,770 lb. of selected Sea Island cotton seed have been imported from Barbados. It has germinated well and given satisfaction. The cotton in the higher lands, planted in May, is well forward, and consequently a better return is looked for.

Mr. W. Robson, the Curator, reports that there is some indication that the growing of lemon grass would be taken up by several small proprietors in Montserrat, if a market could be assured for the oil at a profitable price. Two or three men in the island understand the distillation of the oil.

Within the last fortnight, three separate shipments, of 250 bags of creole rice each, have been made to Barbados. The amount of colony-grown rice exported up to yesterday, is 754,439 lb., in comparison with 30,195 lb. shipped up to the same date last year. (*Demerara Argosy*, August 25.)

The Nassau (Bahamas) *Watchman* says: 'The Canning Factory of the J. S. Johnson Company is still operating on pine-apples. Up to the present time 180,731 dozen pine-apples have been purchased for a pack of 51,594 cases. The company is expecting to reach 65,000 cases before closing the year's operations.'

It may be useful to repeat the announcement that plants of the Central American rubber tree (*Castilloa elastica*) can be purchased at the Botanic Station, St. Lucia, in boxes of fifty plants for 9d. The plants are now ready for distribution. Plants in pots can be supplied at 3s. per 100. Applications should be addressed to the Agricultural Superintendent.

Referring to the difficulties that threaten the muscovado sugar estates in Antigua, in consequence of the exodus of labourers to Panama, Mr. J. Lely, writing to the *Louisiana Planter*, says: 'To fight the labour question will not be very difficult for the central factories, for the introduction of steam ploughs and agricultural implements will save many hands, and the success of central factories, because of the rich cane in these islands, is a sure thing.'

Young cotton in Barbados is being attacked by the red maggot; the insects have probably spread from fields of old ratoon cotton.

The Commissioners of H. M. Customs report that the quantities of molasses delivered on drawback or free of duty for use in distilleries, or for stock-feeding purposes, continue to show an increase, which is particularly noticeable in the quantity delivered for cattle feeding. (*West India Committee Circular*.)

Mr. H. S. Hammond, formerly Assistant Chemist in Jamaica, has recently obtained the B.S.A. degree at the Ontario Agricultural College, Guelph, taking first place among the graduates of the year. Mr. Hammond has since been appointed to a post on the staff of the Rhode Island Agricultural Experiment Station, U.S.A.

According to Messrs. Henry W. Frost & Co.'s Sea Island cotton report for August 18, practically the whole of the last crop has been sold. 'In Carolina we have continued to have too much rain during the past month, resulting in the plant having attained great growth, but putting on not much fruit. The lower pods, being all shaded, are moulding and rotting.'

At a dinner given by the Horticultural Club to the Foreign and British delegates to the International Conference on Hybridization and Cross-breeding, on July 31, at the Hotel Windsor, the toast of 'The Royal Horticultural Society' was proposed by Sir Daniel Morris, K.C.M.G., who congratulated the President, Secretary, and all concerned on the great success which had attended their untiring efforts to bring the society to its present standard.

The Imperial Commissioner of Agriculture has received an inquiry as to whether 'there is any truth in the statement which has been made that there is a *Musa*, somewhat similar to *M. Cavendishii*, which is immune to the attacks of the nematode worms that so frequently attack the roots of bananas.' The editor of the *Agricultural News* would be pleased to receive communications from banana growers or others interested as to any observations they may have made in connexion with this interesting point.

The St. Vincent *Government Gazette*, of August 30, has the following: 'With the approval of the Secretary of State for the Colonies, his Honour the Administrator has appointed Mr. Charles V. Stoute, M.D.V., to be Government Veterinary Surgeon in St. Vincent attached to the Agricultural Department, for a period of one year. Dr. Stoute arrived in the colony and assumed the duties of the office on the 18th. instant. The appointment of Dr. Stoute is made on the recommendation of the Imperial Commissioner of Agriculture, and his services will be specially given to dealing with anthrax.'

A committee is being appointed by the Barbados Agricultural Society to investigate certain cases where planters have neglected to use recognized treatment for controlling cotton pests. Certain managers have neglected to dust ratoon cotton with Paris green when infested with cotton worms, and others have diluted the Paris green with such large quantities of lime as to render the mixture of little or no value in controlling the caterpillars. Centres of infection are thus being formed, from which caterpillars spread through the island. It is hoped that the recommendations of the committee will be seriously considered by the planting community.

DISEASES OF SWEET POTATOS.

The importance of the sweet potato as an article of food throughout the West India Islands renders it necessary to be constantly watching for any trouble that is likely seriously to affect the value of the crop.

One of the diseases that cause damage to this crop in the West Indies is due to the white mycelium of a fungus that envelops the roots and eventually renders them unfit for food. Investigation tends to show that this mycelium belongs to a species of *Marasmius*. It is advisable to use all sweet potatoes that are fit for consumption after being attacked as soon as possible, and no attempt should be made to store them for any length of time. Those that are badly attacked should be removed from the field and destroyed either by fire or by burying with lime.

Bulletin No. 135 of the Alabama Agricultural Experiment Station deals with several fungoid diseases of the sweet potato in Alabama, and the investigations that are now being undertaken in that state seem to show that the greatest loss is experienced in the storage, rather than during the growing season.

One of the most serious diseases is the 'white rot,' which is caused by a fungus that attacks the roots and changes their tissues into a whitish granular substance.

Although few of the diseases described in this preliminary report are known at present in the West Indies, the following remedial measures, as put forward in this report by Dr. E. Mead Wilcox against diseases of the sweet potato, may be of interest:—

1. Avoid sets from any diseased plants.
2. Destroy, either with fire or by burying with lime, all diseased potatoes, and do not allow them to be stored or to remain lying about the field.
3. In storing the potatoes, proper attention should be given to their ventilation, especially during the sweating period just after the roots are taken from the field.
4. During storage no water should be allowed to get upon the potatoes whenever any are taken from the heap.

The value of the sweet potato for consumption, and also as a rotation crop in the West Indies, should induce planters to prevent the spread of any disease that attacks it, and more especially when it is remembered that in Texas a disease that attacks sweet potatoes also attacks the cotton plant.

POLISHED RICE.

The *Sugar Planters' Journal*, of August 4, 1906, quotes Mr. David Fairchild, of the U. S. Department of Agriculture, as follows on the subject of a more sensible consumption of rice:—

Rice is the greatest food staple in the world, more people living on it than on any other, and yet Americans know so little about it that they are actually throwing away the best part of the grains of rice and are eating only the tasteless, starchy, protein-less remainder.

This American fad for polished rice is the most wasteful and unreasonable of any fashion connected with our food products. To a Japanese or a native of rice-growing, rice-eating China this fashion is impossible to understand, and our Carolina golden polished rice, which we consider the finest in the world, is so tasteless that those Orientals who live on the Pacific Coast import unpolished rice from Japan and China for their use, refusing to eat our fair but tasteless product.

The practice of polishing rice continues in the south because the American rice-buying public is guided entirely by looks in its retail purchases. Rice, as sold by the American retailers, is a pretty grain, each kernel as smooth and shiny as a glass bead. In this very glassiness lies the deceit, and, were it not for a false fashion, the buyer would no more expect rice to be smooth and polished than he would wheat or rye.

Like so many grains, after they are threshed, the rice grain is made up of a starchy central portion, inclosed in a delicate, more nutritious covering. This thin, rich, outer part is highly nutritious and full of oily flavouring matter. It is not useless like the pubescence on a peach or the bloom on a plum, but is a nitrogenous coating full of nourishment. Each rice kernel contains, in common with all seeds, a living germ, and in this germ the richest food matters of the seed are concentrated. Yet, because of the American fancy for polished rice, large mills have been erected in the rice-growing south, which rub off, by means of leather polishers, this outer layer and, in the process, remove the nutritious germ; a coating of hot paraffin is even given the kernels. For years the 'polishings,' which contain the germs and rich outer coats were thrown away or sold for \$8 and \$10 a ton for cattle food. Recently the price of them has risen, because the dairymen have discovered their food value for milch cattle and people have found out that they make good cakes, but even now the remarkable condition prevails which forces the handlers of a great staple product to subject it to an unnecessary, expensive process in order to remove from it the most nutritious portions.

Official chemical analyses of polished and unpolished rices show that the unpolished grain has over 11 per cent. more of proteids and 65 per cent. more of oily matters than the polished.

RAINFALL IN GRENADA.

The *Proceedings* of the Grenada Agricultural and Commercial Society contain the following analysis of the rainfall returns at the Richmond Hill station for the fifteen years, 1891-1905:—

Average rainfall for each month in fifteen years.			Total rainfall in each year.		
January ...	...	4.39 inches	1891 ...	...	56.69 inches
February...	...	2.78 "	1892 ...	...	105.89 "
March ...	...	3.05 "	1893 ...	...	84.52 "
April ...	...	2.70 "	1894 ...	...	67.88 "
May ...	...	4.58 "	1895 ...	...	78.47 "
June ...	...	7.80 "	1896 ...	...	99.94 "
July ...	...	9.22 "	1897 ...	...	83.64 "
August ...	...	9.59 "	1898 ...	...	81.77 "
September ...	...	8.14 "	1899 ...	...	64.29 "
October ...	...	5.98 "	1900 ...	...	63.45 "
November ...	...	8.39 "	1901 ...	...	92.15 "
December ...	...	7.92 "	1902 ...	...	70.19 "
			1903 ...	...	78.93 "
			1904 ...	...	69.41 "
			1905 ...	...	77.89 "

Average annual rainfall in the fifteen years ...			78.34 inches.
Minimum rainfall in one month ...			0.49 inches in May 1899.
" " " year ...			56.69 inches in 1891.
Maximum " " month ...			20.90 inches in November 1896.
" " " year ...			105.89 inches in 1892.



ANTIGUA: ANNUAL REPORTS ON THE BOTANIC STATION, EXPERIMENT PLOTS, AND AGRICULTURAL EDUCATION, 1905-6.

Botanic Station.—The total expenditure for the year under review was £631 8s. 7d. The receipts amounted to £25 14s. 11d.

In spite of the fact that considerable difficulties have been experienced on account of the severe drought, much useful work has been done at the Botanic Station and the Experiment Stations.

The rainfall for the year was 35.10 inches. Although this is rather more than in 1904-5, it is still far below the average.

From the nurseries 5,561 economic plants were distributed, in addition to large quantities of seeds of various kinds.

Experiment Plots.—At the Scott's Hill and Skerrett's Experiment Stations useful work was prosecuted in connexion with variety trials of several food crops. The varieties which were found to give the best results were distributed to planters and peasants. Experiments were also carried out with cotton.

Agricultural Education.—This is a record of the work of the Agricultural and Science Master, who is attached to the Grammar School.

In addition to his work in that institution, Mr. Kirby gave instruction at the Girls' High School, lectures at the Female Training College for teachers, and also lectures to teachers in the elementary schools.

In forwarding this report Dr. Watts states: 'This is a wide range of work, calculated to influence both primary and secondary education: its effect is already apparent and will become more and more marked as time goes on.'

ST. KITTS-NEVIS: REPORTS ON THE BOTANIC STATION, ECONOMIC EXPERIMENTS, AND AGRICULTURAL EDUCATION, 1905-6.

The total expenditure on agricultural services in St. Kitt's-Nevis for the year was £1,208. Of this amount £464 12s. 3d. was expended on the Botanic Station, and £250 10s. 4d. on the economic experiments with sugar-cane, cotton, etc. The receipts from the sale of plants, etc., at the Botanic Station, and of produce grown in the Experiment Plots amounted to £95 17s. 11d.

Botanic Station.—The general condition of the station is reported to be satisfactory. A number of new trees were planted out during the year.

The number of plants distributed was less than in the previous year. The total number (1,040) included 439 cacao plants and 289 rubber plants.

It is again satisfactory to note that the cultivation of cacao and rubber trees is being extended.

The rainfall for the year (36.65 inches) was less than last year and 6 inches below the average for the last six years.

Economic Experiments.—The experiments with various food and other crops were continued at La Guerite. The

experiments with sweet potatoes, cassava, and yams consisted in comparative trials of a large number of varieties. Useful results as to the yield of these are recorded. Experiments were also carried on in the cultivation of tobacco and cotton.

The report contains an account of the progress in the establishment of the cotton industry, which is reviewed elsewhere in these columns.

Agricultural Education.—The expenditure on agricultural education during this period amounted to £249 6s. 11d. The sum of £11 6s. 11d. was spent on equipment, including botanical diagrams for the school-room. Eleven scholars were in attendance on the agricultural side of the school during the year. Mr. Mitchell reports that their general progress has been satisfactory.

As in previous years, the indoor work of the scholars has been supplemented by practical work in the school garden, special attention being paid to such garden operations as budding. Various experiments with economic and garden crops were also carried out.

Agricultural Instructor for Nevis.—The expenditure on the branch station at Nevis during the year amounted to £184 16s. 5d. The sale of produce, etc., yielded £2 7s. 5d.

This station is maintained purely for experimental purposes. It is divided into eight plots, which were cultivated with various economic crops. One plot has been set aside as a nursery for lime plants. Among the crops planted were Guinea corn, Indian corn, yams, peppers, velvet beans, and cassava. In most cases trials of different varieties were conducted. One plot was devoted to a 'distance' experiment with cotton.

The rainfall at the station during the year was 44.34 inches. Judging by the returns from an adjoining estate, this would appear to be about 10 inches below the average.

BEE FARMING IN VICTORIA.

The following note on the bee-keeping industry of Victoria appears in *Australia To-day*, a special issue of the *Australasian Traveller*, of December 15, 1905:—

The returns of the Government Statist for 1904 show that there are 5,609 bee keepers in the state, owning 40,759 hives, which gave a return of 833,968 lb. of honey, and 18,979 lb. of bees'-wax. Bees are kept in almost every county of the state, and the eucalyptus trees of the native forests afford the best bee forage. The country south of Horsham, in the Wimmera, about the head waters of the Glenelg, and along the foot of the Grampians is particularly rich in honey-yielding eucalyptus trees. Efforts have been made to place Australian honey on the English market, but the British public dislike the eucalyptus flavour, which is said to be imparted to the honey, and the trial shipments were not a success. The Australian palate appears to have grown accustomed to it, however, and no objection is raised to its taste in the Commonwealth. Probably, more attractive methods of putting up the honey for the retail trade, and better means of securing its distribution would enable the British prejudice to be overcome. Steady progress is being made in improved methods of apiculture. A bee keepers' association holds an annual conference in Melbourne, and adopts other means of disseminating useful information respecting the industry. About half the hives in the state are worked on the modern Langstroth or other approved frame systems. Pedigreed Ligurian queens are raised for sale, and most of the leading bee keepers have Ligurian bees, which are better and more active workers than the common black bees.

WEST INDIAN PRODUCTS.

Drugs and Spices in the London Market.

The following report on the London drug and spice market for the month of July has been received from Mr. J. R. Jackson, A.L.S.:—

In reviewing the general character of the drug and spice markets during the month of July, it may be stated that, considering the season fairly begins with the month, the general tone of business has not been lowered to the extent that is often found at this season of the year. Ginger, especially Jamaica, and sarsaparilla have occupied much attention, advanced prices being noted for the former, and a sudden drop to nearly one-half its previous values being recorded in the case of the latter.

GINGER.

At the spice sale on the 11th., 385 packages of Jamaica were offered and about 200 sold at increased rates; good bold realizing 82s. per cwt., fair to good bright, 70s. to 75s., and ordinary to good ordinary, 58s. to 62s. A week later some 540 packages of Jamaica were offered, and about 125 sold; 3 barrels of fine bold bright realized 105s. per cwt., whilst good bright fetched 81s., fair bright 74s., and common to good common 58s. to 60s. There was no demand for Cochin or Calicut, of which small supplies were offered. Limed Japan was bought in at 26s. There was scarcely any change at the last auction in the month, a few sales only being made of Jamaica at steady rates, including dullish washed at 62s. to 65s., and common to good common at 57s. 6d. to 60s.

NUTMEGS, MACE, AND PIMENTO.

For the first two there was a steady demand at usual rates. At the close of the month West Indian mace sold at 1s. 5d. to 1s. 6d. for palish, and 1s. 4d. to 1s. 5d. for fair mixed. Pimento, at the first sale on the 4th., was firm at 2½d. per lb. for fair, which price was maintained to the end.

ARROWROOT.

At the spice auction on the 4th., 100 barrels of St. Vincent sold at 1¼d. to 1½d. per lb. for good manufacturing, which was practically the whole of the sales in St. Vincent during the month. Twenty-eight cases of Natal were offered at auction on the 18th. and bought in at 3¼d.

SARSAPARILLA.

At the first drug auction on the 5th., 56 packages of grey Jamaica were offered, 41 of which found purchasers at a reduction of 2d. to 3d. on previous prices, the first 21 bales fetching 2s. 2d. to 2s. 3d. for good sound, and 1s. 9d. to 2s. for sea-damaged; the quotations for the remainder being 2s. 1d. to 2s. 2d. for sound, and 1s. 2d. to 1s. 7d. for sea-damaged. Four bales of native Jamaica sold at 9d. to 10½d. for common dull to mixed red sea-damaged. A week later the reports were that native red was scarce and would readily fetch 1s. 4d. to 1s. 6d. per lb.; and at the usual fortnightly sale on the 19th. the quotations were much lower. Two new arrivals of grey Jamaica, the first 21 bales being bought in at 2s.; 36 bales were next disposed of at a decline of about 6d. on previous rates, 1s. 7d. being paid for 1 bale, after which the prices dropped by degrees to 1s. 4d., the qualities being in some cases equal to the higher-priced lots.

KOLA, TAMARINDS, AND CASSIA FISTULA.

One half-barrel of good fresh Grenada kola was offered on the 4th. and disposed of at 9d. per lb., and on the 18th. 2 bales of good dried Grenada realized 4½d. Two tubs of fine

West Indian tamarinds from St. Vincent were sold at the first sale at 15s. per cwt. At the close of the month good Barbados in bond were quoted at 18s. to 20s. Of Cassia Fistula good fresh pod from Dominica sold towards the end of the month at 15s. 6d. to 16s. per cwt., and fair at 15s.; good bold has fetched 17s. 6d.

LIME JUICE, QUASSIA CHIPS, AND ORANGE PEEL.

There has been a quiet but steady demand for lime juice, good pale fetching from 1s. 3d. to 1s. 4d. per gallon. Throughout the month, Quassia chips have been realizing higher prices, 13s. to 15s. being asked for ordinary dried; and towards the end of the month as much as 20s. per cwt. has been asked, in consequence, it is said, of the trees becoming scarce. Darkish Tripoli strip orange peel has been sold at 4½d. per lb., 6d. being asked for fair.

CENTRAL SUGAR FACTORIES IN MARTINIQUE.

The following article appeared in the *Louisiana Planter*, of August 18:—

The French Government has for many years given preference in the way of duties to sugars coming from her colonies. On this account the sugars produced in Martinique and Gaudeloupe are generally sent to France and rarely to any other of the world's sugar markets. This preference acts as a bounty to the producers of these sugars, without which the sugar planters of Martinique and Guadeloupe would have had much greater difficulty in meeting the exigencies of the sugar market during recent years.

La Sucrerie Indigene et Coloniale has given a report recently of the Usine du Marin. At a recent meeting of the stockholders of this factory a report was made for the season of 1904-5, during which 9,669 tons of cane had been worked, the factory paying for the same \$3.26 per ton. The average sugar yield was 7.99 per cent., or about 160 lb. of sugar per ton of cane. The yield of molasses and rum was an important factor in the total proceeds of each ton of cane consumed. The capital stock of this factory is \$170,000, and it is estimated that for the season under consideration the total losses were \$6,045. This is not a very good showing for the year under consideration, when the prices of sugar throughout the world were higher than usual.

During the same year the Usine du François, one of the most prosperous in the colony, worked 29,231 tons of cane, costing \$3.28 per ton. The total yield of sugar was but 6.64 per cent., or 133 lb. per short ton. In this factory also the molasses and rum formed material parts of the proceeds of manufacture. The capital stock of this factory is about \$265,000, with a reserve of about \$90,000. This factory cultivates no cane for its own account, but loaned out some \$60,000 to cultivators, whose produce came to the factory.

A notable feature of the report of these two factories is as to the cost of the manufacture of a ton of cane in each of them. The Usine du Marin reports this cost at \$1.42 per ton while Usine du François reports the cost at \$1.37 per ton. These costs are presumed to cover the entire cost of manufacture up to the time that the produce is in shipping order and ready for export. While the costs of manufacture should perhaps not include such fixed charges as interest, it ought to include all taxes and salaries, and also the cost of repairing machinery and maintaining it in effective condition; to this may be added also insurance. Unless the items of cost of manufacture were given in detail, it would not be known whether or not the costs of the process in these two factories would be comparable.

MARKET REPORTS.

London,—August 15, 1906. Messrs. KEARTON, PIPER & Co.; Messrs. E. A. DE PASS & Co.; 'THE WEST INDIA COMMITTEE CIRCULAR' August 8; 'THE LIVERPOOL COTTON ASSOCIATION WEEKLY CIRCULAR,' August 10; and 'THE PUBLIC LEDGER,' August 11, 1906.

ALOES—Barbados, 15/- to 60/-; Curaçoa, 20/- to 55/- per cwt.
ARROWROOT—St. Vincent, 2d. per lb.

BALATA—Sheet, 1/4 to 1/11; block, 1/4 to 1/4½ per lb.

BEES'-WAX—£8 to £8 10s. per cwt.

CACAO—Trinidad, 57/- to 63/- per cwt.; Grenada, 49/- to 54/- per cwt.

CARDAMOMS—Mysore, 7½d. to 3/- per lb.

COFFEE—Jamaica, good ordinary, 41/- to 43/- per cwt.

COTTON—West Indian, medium fine, 6½d.; West Indian Sea Island, medium fine, 13d.; fine, 14d.; extra fine, 15½d. per lb. Prices paid, 5¼d. to 16d. per lb.

FRUIT—

GRAPE FRUIT—14/- to 16/- per box.

BANANAS—Jamaica, 4/6 to 6/- per bunch.

LIMES—4/- to 4/6 per box.

ORANGES—12/- to 14/- per case.

FUSTIC—£4 to £4 10s. per ton.

GINGER—Jamaica, 57/- to 63/- per cwt.

HONEY—Dark to good reddish, 17/- to 22/- per cwt.

ISINGLASS—West Indian lump, 1/9 to 2/3; cake, 1/1 per lb.

KOLA NUTS—4d. to 6d. per lb.

LIME JUICE—Raw, 11d. to 1/3 per gallon; concentrated, £21 per cask of 108 gallons; hand-pressed, 2/6 to 2/9 per lb. Distilled Oil, 2/6 per lb.

LOGWOOD—£4 to £4 15s.; roots, £3 10s. to £4 per ton.

MACE—Good palish, 1/5 to 1/6; fair pale and reddish, 1/4 to 1/5 per lb.

NITRATE OF SODA—Agricultural, £11 15s. per ton.

NUTMEGS—66's, 1/4; 79's, 10d.; 104's, 7d.; 109's, 6½d. per lb.

PIMENTO—Fair, 2½d. to 3½d. per lb.

RUM—Jamaica, 2/1; Demerara, 9½d. per proof gallon.

SUGAR—Yellow crystals, 15/3 to 15/6 per cwt.; Muscovado, 13/- to 14/- per cwt.; Molasses, 10/- to 14/- per cwt.

SULPHATE OF AMMONIA—£11 15s. per ton.

Montreal,—July 20, 1906.—Mr. J. RUSSELL MURRAY.
(In bond quotations, c. & f.)

COCOA-NUTS—Jamaica, \$26.50 to \$28.50; Trinidad, \$25.00 to \$26.00 per M.

COFFEE—Jamaica, medium, 10c. to 11c. per lb.

GINGER—Jamaica, unbleached, 14c. per lb.

MOLASCUIT—Demerara, \$1.00 per 100 lb.

MOLASSES—Barbados, 27c. to 28c.; Antigua, 22c. to 23c. per Imperial gallon.

NUTMEGS—Grenada, 110's, 18c. per lb.

PIMENTO—Jamaica, 6c. per lb.

SUGAR—Grey crystals, 96°, \$2.15 to \$2.20 per 100 lb.

—Muscovados, 89°, \$1.65 to \$1.80 per 100 lb.

—Molasses, 89°, \$1.45 to \$1.65 per 100 lb.

—Barbados, 89°, \$1.60 to \$1.85 per 100 lb.

New York,—August 24, 1906.—Messrs. GILLESPIE BROS. & Co.

CACAO—Caracas, 12½c. to 13½c.; Grenada, 12c. to 12½c.; Trinidad, 11½c. to 12½c.; Jamaica, 9½c. to 12c. per lb.

COCOA-NUTS—Jamaica, \$27.00 to \$28.00; Trinidad, \$26.00 to \$27.00 per M.

COFFEE—Jamaica ordinary, 8½c. to 8¾c.; good ordinary, 8¾c. to 9c. per lb.

GINGER—Dark scraggy root, 10½c. to 11½c.; white to bright bold, 11½c. to 14½c. per lb.

GOAT SKINS—Barbados, Dominica, and Antigua, 59c.; Jamaica, 59c.; St. Kitt's, 49c. to 51c. per lb.

GRAPE FRUIT—Jamaica, \$5.00 to \$8.00 per barrel; \$3.50 to \$4.50 per box.

LIMES—Dominica, \$5.00 to \$6.00 per barrel.

MACE—31c. to 36c. per lb.

NUTMEGS—West Indian, 80's, 20c.; 90's to 100's, 15½c.; 110's, 13c.; 130's, 11c. per lb.

ORANGES—Jamaica, \$4.50 to \$5.00 per barrel; \$2.00 to \$2.50 per box.

PIMENTO—5½c. to 5¾c. per lb.

SUGAR—Centrifugals, 96°, 31½c. to 4c.; Muscovados, 89°, 31½c. to 3½c.; Molasses, 89°, 3½c. to 3¼c. per lb., duty paid.

INTER-COLONIAL MARKETS.

Barbados,—August 27, 1906.—Messrs. T. S. GARRAWAY & Co., and Messrs. JAMES A. LYNCH & Co., August 28, 1906.

ARROWROOT—St. Vincent, \$4.00 to \$4.10 per 100 lb.

CACAO—\$11.50 to \$12.00 per 100 lb.

COCOA-NUTS—\$15.00 per M. for husked nuts.

COFFEE—\$10.00 to \$10.75 per 100 lb.

HAY—90c. to \$1.00 per 100 lb.

MANURES—Nitrate of soda, \$60.00; Ohlendorff's dissolved guano, \$55.00; Cotton manure, \$48.00; Cacao manure, \$45.00; Sulphate of ammonia, \$75.00; Sulphate of potash, \$67.00 per ton.

ONIONS—Lisbon, \$2.00; Madeira, \$1.51 to \$2.00 per 100 lb.

POTATOS, ENGLISH—\$3.25 per 160 lb.; Nova Scotia, \$3.75; Bermuda, \$4.25 per 160 lb.

RICE—Ballam, \$6.00 to \$6.10 per bag (190 lb.); Patna, \$3.30 to \$3.40; Rangoon, \$2.95 to \$3.00 per 100 lb.

SUGAR—No quotations.

British Guiana,—September 1, 1906.—Messrs. WIETING & RICHTER.

ARROWROOT—St. Vincent, no quotations.

BALATA—Venezuela block, 25c.; Demerara sheet, 38c. per lb.

CACAO—Native, 12c. to 13c. per lb.

CASSAVA STARCH—\$5.00 per barrel.

COCOA-NUTS—\$10.00 to \$12.00 per M.

COFFEE—15c. per lb.

DHAL—\$4.60 per bag of 168 lb.

EDDOS—60c. to \$1.00 per barrel.

MOLASSES—No quotations.

ONIONS—Madeira, 2¼c. per lb.

PLANTAINS—32c. to 48c. per bunch.

POTATOS, ENGLISH—2c. to 2½c. per lb.

POTATOS, SWEET—Barbados, \$1.32 per bag.

RICE—Ballam, \$5.75 to \$6.00 per 177 lb.; Creole, \$5.35 to \$5.50 per bag (ex store).

SPLIT PEAS—\$5.90 to \$6.00 per bag (210 lb.).

TANNIAS—\$2.16 per barrel.

YAMS—White, \$1.68; Buck, \$3.00 per bag.

SUGAR—Dark crystals, \$2.25; Yellow, \$2.40 to \$2.55; White, \$3.65 to \$3.75; Molasses, \$1.40 to \$1.65 per 100 lb. (retail).

TIMBER—Greenheart, 32c. to 55c. per cubic foot.

WALLABA SHINGLES—\$3.00, \$3.75, and \$5.25 per M.

Trinidad,—August 31, 1906.—Messrs. GORDON, GRANT & Co.

CACAO—Ordinary to good red, \$12.75 to \$13.00; estates, \$14.00 per fanega (110 lb.); Venezuelan, \$13.75 to \$14.00 per fanega.

COCOA-NUTS—\$20.00 per M., f.o.b.

COCOA-NUT OIL—70c. per Imperial gallon (cask included).

COPRA—\$3.70 to \$3.80 per 100 lb.

DHAL—\$4.40 to \$4.50 per 2-bushel bag.

ONIONS—\$1.90 to \$2.00 per 100 lb. (retail).

POTATOS, ENGLISH—\$1.25 to \$1.75 per 100 lb.

RICE—Yellow, \$5.90 to \$6.25; White, \$5.40 to \$5.50 per bag.

SPLIT PEAS—\$5.70 to \$5.90 per bag.

SUGAR—Grocery, \$2.00 to \$2.50 per 100 lb.



A FORTNIGHTLY REVIEW OF THE IMPERIAL DEPARTMENT OF AGRICULTURE FOR THE WEST INDIES.

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The Assistance of Science in Colonial Development.

IN his opening address, as President of the Chemical Section of the British Association, at its meeting held recently at York, Professor Wyndham R. Dunstan drew the attention of the members to the intimate relationship between

science and the problems that await solution in connexion with the utilization of the raw materials and economic products of Great Britain's colonies, and especially those of her tropical possessions. He urged that the Imperial Government should recognize much more fully than it had hitherto done, and at least as fully as foreign Governments were already doing, the claims of scientific investigation to be regarded as the pioneer instrument of that work, and as the essential first step in the material and commercial development of those possessions. His plea was that the scientific method of experimental research should be systematically applied in each division of the sciences concerned.

Wide interests were involved, Professor Dunstan said, in the proper solution of the problem of colonial development. Many food commodities and raw materials for the manufactures were derived almost exclusively from the tropics, and experience had shown that it was a great disadvantage to the manufacturer not to be able to exercise control in the direction of securing the regular production of these materials, and not to be able to avoid great and sudden fluctuations in price as a result of financial speculation on a foreign market. He instanced the disastrous effects on the cotton trade which resulted from its being at the mercy of American speculators, in consequence of its almost entire dependence on the cotton crop of the southern states of America.

The great principle which must now guide the system of administration in tropical possessions had as its purpose the utilization of natural resources and the creation and development of native industries with the aid of European supervision and advice. Territories

would thus be developed for the advantage of the manufacturers and consumers and, at the same time, for the benefit of the native inhabitants.

Professor Dunstan then proceeded to emphasize the aid which science, in several of its branches, and especially the science of chemistry, could render to this work of development.

Considerable progress had been made in recent years in developing the resources of the tropical possessions. Tea, coffee, jute, and rubber, for example, were being more and more extensively produced within the empire, while the cultivation of cotton, hitherto principally carried on in the United States, was being vigorously proceeded with in India, the West Indies, and in West Africa, as well as in Egypt and the Soudan, and it might be anticipated that in the future these countries would supply the British manufacturer with a large proportion, if not the whole, of the cotton he required.

There were, however, vast resources, both mineral and vegetable, in the colonies and protectorates, which were awaiting development for an exact knowledge of their composition and properties. The British manufacturer was in need of increased and better supplies of the raw materials on which his industrial activity depended.

Science could render most important service to existing industries and their extension by contributing to the imperial problem of ascertaining, and rendering available for the manufacturer, the vast undeveloped resources of Great Britain's tropical possessions. Such work could not be systematically carried on by private enterprise; the successful accomplishment of it could be brought about only by combined effort on the part of the manufacturer and the Government.

Experience had shown that the most effective manner of promoting the commercial development of a new country was for the Government to carry out systematically, with its own officers, the preliminary work of exploration and examination of natural resources, and then, having established the fact that particular products of value could be found or cultivated in a given country, to leave commercial enterprise to do the rest.

Many of the Crown colonies and protectorates already had agricultural departments, which included officers engaged in exploring and developing the vegetable resources of those countries, especially by experimental planting. To some of these departments

chemists were attached. Valuable work was being accomplished, for example, by the various Government Chemists in the West Indies, which illustrated the great services which the science of chemistry might render, not only to tropical agriculture, but to every branch of economic development. It was desirable that each of the principal Crown colonies and protectorates should have an agricultural department with the services of a chemist at its disposal.

If Great Britain were to compete successfully with foreign countries, it was necessary that the position of science in relation to tropical agriculture should be definitely recognized, and a colony now required a scientific department with a proper complement of properly trained officers. Professor Dunstan also urged the importance of focussing the work which was being accomplished by these various departments, and of rendering available in other colonies the results obtained in one colony. In other words, to unify the work of all such establishments by co-operation with a central department.

The remainder of this very interesting address was devoted to a review of some of the more important investigations in connexion with the chemistry of certain of the raw materials employed in the principal manufacturing industries of the city of York, dealing especially with those connected with the production of India-rubber or caoutchouc.

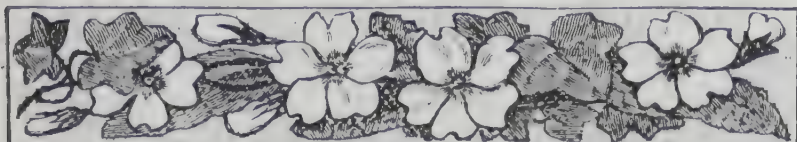
TRINIDAD AGRICULTURAL SOCIETY.

The following note is extracted from the *Proceedings* of the Trinidad Agricultural Society:—

Towards the close of 1905 some questions arose as to whether the society was working strictly in accordance with the provisions of the Ordinance, No. 9, of 1894, under which it was incorporated, and also as to whether the scope of its influence and utility in other directions might not be enlarged, if it were reorganized under a new Ordinance which would simplify the procedure and leave the direction of details entirely in the hands of a committee to manage on behalf of the society.

His Excellency the President nominated a special committee to consider the matter, consisting of Professor Carmody, F.I.C., F.C.S. (Chairman), the Hons. G. Townsend Fenwick, C.M.G., S. Henderson, C. deVerteuil, and Mr. J. G. deGannes. The select committee reported to the general committee who adopted the report on March 5. The report was sent to the Governor, and, being approved by his Excellency, forms the basis of an Ordinance about to be placed before the Legislative Council, which will repeal the existing Ordinance and re-incorporate the society on a new and, it is hoped, a better and sounder footing.

At a meeting of the Legislative Council on September 10, an Ordinance was passed giving effect to the recommendations of the committee.



SUGAR INDUSTRY.

Cane Farming in Trinidad.

The following information is abstracted from returns relating to the Trinidad cane farmers' crop of 1906 (with figures for the eight previous years), published as Agricultural Society Paper No. 244:—

Year.	Total sugar made. Tons.	Tons of sugar made from estate canes.	Tons of estate canes ground.	Tons of canes purchased.	Amount paid for canes.	Number of farmers.
1906	62,975	39,735	397,912	237,844	\$469,122	11,573
1905	38,240	—	244,418	144,868	482,053	10,866
1904	50,744	1,669*	385,015	171,947	360,046	9,331
1903	—	1,783*	337,632	166,590	348,445	8,883
1902	—	4,379*	337,911	184,867	327,183	9,356
1901	—	3,652*	434,003	169,918	369,482	8,556
1900	—	1,286*	364,355	105,996	227,865	6,417
1899	—	1,571*	426,306	106,741	219,011	6,696
1898	—	—	—	105,753	202,901	6,150

* Sugar made from estate canes not weighed.

Sugar-cane in Queensland.

In *Australia To-day*, a special issue of the *Australasian Traveller*, of December 15, 1905, the following reference is made to the cultivation of sugar-cane in Queensland:—

The sugar industry is at present in a very flourishing condition. Only cane sugar is produced, attempts to establish the sugar beet having failed, because our farmers have considered that they can do better with other products whose production does not involve so much labour as the growing of beet. Several large districts are, however, essentially suited to the sugar beet, a good yield of roots with a high sugar content being very easily obtained. No doubt the industry will be added to the resources of the state when the commercial conditions become favourable.

Sugar-cane has been grown on the Clarence, Richmond, and Tweed rivers for many years. Before a refinery was established in Sydney, large sums were lost in the manufacturing part of the business. Scores of sugar mills sprang up in the river districts, but when a large sugar company came into business and created its own refineries, the other crushing mills were gradually silenced. Now almost all the cane is bought by the company at its mills, the farmers being paid a fixed price each year, with a bonus on cane containing more than 12 per cent. of sugar. The company, which carries on large operations in Fiji and in Queensland, thus provides the market, and, while its shareholders receive good dividends, the farmers manage to make the cane pay.

PRODUCTION FROM CANE.

The output in 1904 was 227,511 tons from 10,405 acres of cane cut for the mills. The value of the crop is £195,856.

The number of holdings on which sugar-cane is planted is 1,060. The average yield is about 20 tons per acre. In pursuance of a 'White Australia' policy, the Commonwealth Government allows a bonus of 4s. per ton on all cane grown by white labour, and in this state almost the whole crop is now produced in this way. The bonus is accounted for in the value given above. The company pays from about 9s. to 12s. per ton for cane, cut and delivered at the mills. The average return to the farmer is, with the bonus, about £12 per acre, which makes sugar-cane the most valuable crop produced in the state.

The cane is established by ploughing land where the surface is clear of stones and timber, but many of the small men plant by hand between stones and stumps, and the cane grows and flourishes in the splendid soil. It is planted in pieces cut from the upper half of the cane and laid horizontally in the ground. Each set has three or four good 'eyes' and from these the cane shoots upwards. As the cane grows, the land must be cultivated and weeded, until the foliage above becomes so dense that the weeds cannot make headway for lack of sunlight.

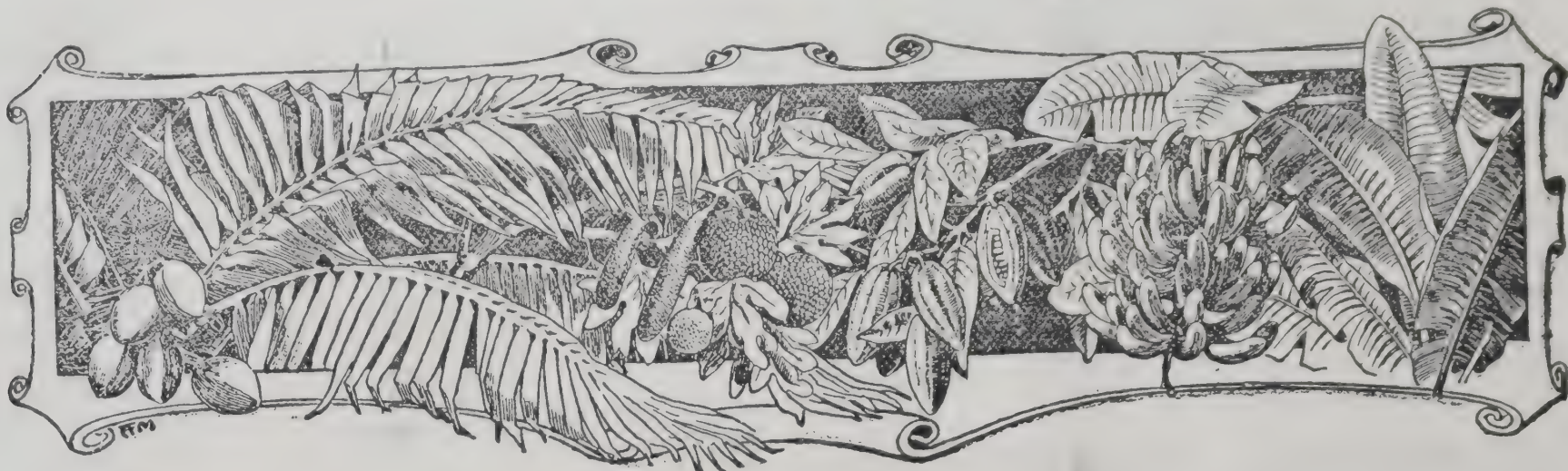
Sugar-cane in Louisiana.

In an article in the *Yearbook* of the U.S. Department of Agriculture, entitled 'Illustrations of the Influence of Experiment Station Work on the Culture of Field Crops,' the following reference is made to the sugar-cane in Louisiana:—

Experiment station work with sugar-cane is practically limited to the Louisiana station. When this station was established, the crop was almost entirely cultivated with the turning plough, but at present it is estimated that not more than 10 per cent. of the crop grown in the state is cultivated by this method. The station was the first to demonstrate to the planter the value of the cultivator in the more economical production of the cane crop, and this implement is now quite generally used. This result was achieved by the station inducing certain planters to give the cultivator a trial, and when these had proved its value, others followed their example. In addition, the manufacturers of cultivators used this testimony in selling their implements and thus became an important factor in extending their use. The cultivator, as compared with the turning plough, not only saves labour but is also more efficient in the eradication of weeds, especially in rainy seasons. The work of the station has also been the greatest factor in reducing the width of the cane rows, and at present very few planters are still using the 7-foot rows, while practically none are using 7½-foot rows.

Among the new varieties of sugar-cane introduced by this station, seedling canes D. 74 and D. 95 are giving most promising results. These canes were sent out about nine years ago and have now been so thoroughly tested that some of the planters are at present growing from one-half to two-thirds of their crop of the D. 74. The mill and field tests of this cane during the past few years have established a good record, and if the results continue to be as satisfactory as they have been, it is fair to assume that, in a few years, much the greater proportion, if not the entire crop of the state, will be of D. 74.

Patent Process in Rum Manufacture. It is officially announced that a patent has been registered for a process of which Mr. H. H. Cousins, Government Chemist, Jamaica, 'claims to be the inventor or proprietor, being an invention for processes for treating spirituous liquors.'



WEST INDIAN FRUIT.

A NEW BANANA.

In a report on a botanical mission through the Forest districts of Buddu, etc., of the Uganda Protectorate, Mr. M. T. Dawe, Officer-in-charge of the Forestry and Scientific Department, describes the finding of a new banana in the Toro district, the description of which is as follows:—

It is singular in that it has not the usual cone of male flowers and bracts at the extremity of the panicle, which is abrupt and only prolonged a few inches beyond the fruiting portion. The bunch has from five to thirty fingers or even more; but the fewer the bunch contains the larger they are. They are frequently 12 to 15 inches long and from 7 to 9 inches in circumference. They are excellent to eat when ripe and are also very useful for cooking purposes.

Dr. Stapf, of the Royal Botanic Gardens, Kew, considers it to be closely allied to *Musa corniculata*, a Malayan species, the fruit of which has been compared with a cucumber as regards shape and size.

JAMAICA ORANGES.

The *West India Committee Circular* publishes the following as a warning to Jamaica fruit growers:—

Dealing with the imports of oranges into the United Kingdom from Jamaica, the *Fruit-Grower* reminds the Jamaica growers and senders that the immense advantage which this practical monopoly gives should be made the most of. There is no fruit grown more welcome during the late summer and early autumn months than oranges, and Jamaica oranges are especially good from the fact that they are thin-skinned, have an exceedingly refreshing juice, and are, in fact, an all-round fine fruit for hot weather. There is scarcely any limit to the quantity of such fruit we can take. It should therefore be a subject for earnest conference amongst the growers and others interested in orange shipments from Jamaica to see how far such a demand can be met. The statistics compiled by Mr. B. C. Orgill, which show that a total of over 84,000 cases of citrus fruits were sent from Jamaica to the United Kingdom between August 23, 1905, and February 1, 1906, and that Jamaica has practically the entire market for oranges for nearly three months, are interesting from many points of view, and are likely to be very carefully digested in all parts of the world where oranges can be grown for export. So that, unless the Jamaica growers put their house in order at once, it is more than likely that we shall find these fruits reaching us from other sources.

BUDDED ORANGES IN TRINIDAD.

The following is extracted from the Annual Report of the Trinidad Botanical Department:—

When the Experiment Station was started in 1898, one of the first works carried out was the planting of a select lot of orange trees, which had shortly before been imported from Florida.

Well-established budded plants of all the kinds can be purchased at the nurseries, but the demand is so large that orders should be lodged well beforehand, and can only be taken in rotation. It may be said of them that there is not a bad kind in the lot of fourteen varieties. They do not show to advantage in the dry soil at St. Clair, and the fruit of some kinds in adverse seasons is necessarily small, but planted in good soil, it has been seen that they produce fruit excellent in size and quality.

Plants bought at the St. Clair nurseries have been known to fruit in their fourth year. The price has been fixed at 24c., or 1s. each—well established in bamboo pots, delivered at the nurseries. This is practically cost price.

A list of these varieties of oranges was published in the *Agricultural News*, Vol. V, p. 20.

PINE-APPLES FROM DOMINICA.

In June last, three crates of pine-apples, grown at the Dominica Botanic Station, were shipped to Messrs. George Monro, Ltd., of Covent Garden. Two of the crates contained 'Smooth Cayenne' pine-apples, and the other 'Bullheads,' and it was with reference to the latter, especially, that a Covent Garden opinion was desired.

Messrs. Monro reported:—

This variety is apparently a cross from the 'Ripley Queen,' as it is very similar in some respects to it. Most of these were ripe, but not of so good a shape as the 'Smooth Cayenne,' and customers do not appear to take to them. . . The quality is good, and they might possibly sell if customers get to know them, but at present there is nothing that takes the market better, and is more reliable, than the 'Smooth Cayenne.' In fact there is nothing else coming from the Azores but that variety.

The three crates sold for £3 13s. 9d.

CASTILLOA RUBBER IN TOBAGO.

The accompanying illustration (fig. 17.) shows young cacao trees growing under the shade of trees of the Central American rubber (*Castilloa elastica*) at Agenza estate, Tobago.

It is stated in Pamphlet No. 41, entitled 'Tobago, Hints to Settlers,' recently issued by the Imperial Department of Agriculture, that there are some 100,000 *Castilloa* trees planted in Tobago, mostly through cacao. Where they have been planted alone, the owners are, in most cases, running cacao through the rubber.



FIG. 17. CASTILLOA TREES, AND YOUNG CACAO UNDER RUBBER.
(Agenza estate, Tobago.)

'A good deal of rubber (*Castilloa*) has been planted as a shade for cacao, and the two trees grow well together.

'Rubber planted through cacao, about seventy trees to the acre, has been found from actual experience in Tobago to give a yield of $\frac{1}{2}$ lb. per tree per year when eight years old, and this without any effect on the cacao crop. So that, although the cultivation of rubber in the island is still in the experimental stage, it would seem sound policy to plant the two trees together, seeing that the cost of establishing the rubber would be practically nil, it taking the place of the usual shade tree.

'Rubber from eight-year-old trees has sold for 4s. to 5s. per lb. Scrap rubber from five-year-old trees sold at 3s. 6d.'

RICE CULTIVATION IN THE UNITED STATES.

The *Consular Report* on the trade of Texas for 1905 has the following account of the progress of the rice industry in the United States:—

The cultivation of rice in the south-western states is of comparatively recent date. Formerly, whatever rice was grown in the United States was cultivated in the Carolinas and Georgia, but these districts have of late been completely overshadowed by the newer fields of Louisiana and Texas.

The swampy lands on the coast of the Gulf of Mexico in these two states have been found to be peculiarly suited to the growth of rice, and land that was a few years ago thought to be almost valueless is now sold at high prices. Additional impulse has been lent to the industry by the presence of several colonies of Japanese, skilled rice cultivators, and more of them are expected. There are already several hundred of these Japanese.

The progress of the rice industry in Texas can readily be seen when it is stated that, according to the report issued by the Secretary of Agriculture at Washington in December last, out of a total of 460,198 acres under rice cultivation in the United States in 1905 no less than 432,286 acres were in Louisiana and Texas, 237,900 acres in the former and 194,386 acres in the latter. Texas produced 6,025,966 bushels, of an average value of \$1.00 per bushel, and Louisiana 6,137,820 bushels, of an average value of 89c. per bushel.

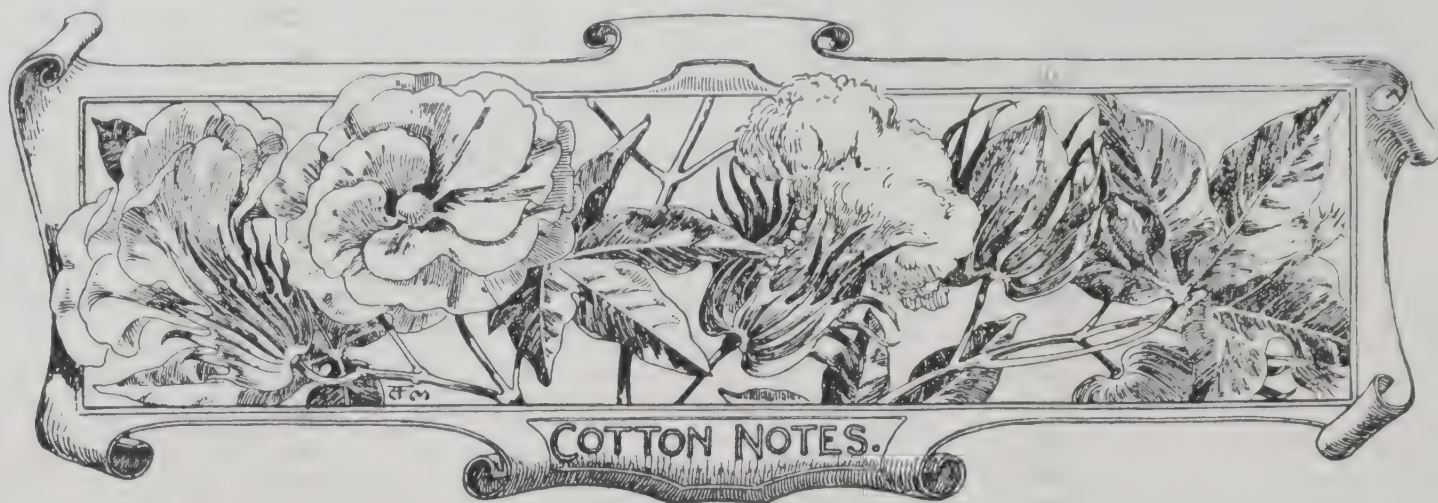
As yet, however, there is comparatively little rice exported from Texas, the bulk being grown for home consumption.

A small quantity was shipped abroad in the early part of 1905, but none of the present crop. It will, however, be but a question of time before the rice-exporting business assumes considerable importance, so it is stated.

POLISHING OF RICE.

On the subject of polishing rice, reference to which was made in the last issue of the *Agricultural News* (p. 285), Mr. Consul Nugent writes:—

The following extract from a well-known American paper regarding the liking of the public for polished rice may prove of interest: 'The rice that comes on the American table looks "mushy"; the grain seems all mashed together instead of being distinct and large. The trouble (sometimes due to cooking) is usually explained by the statement that our rice is of an inferior quality, though there is no better rice in the world than our Louisiana and Texas articles; the grains are large, firm, and nutty. The fact is that our public will not buy any rice unless the grains shine and glisten. Consequently the first thing the miller does is to put his rice crop through a course of polishing, by which the covering of the kernel is rubbed off, and at the same time the most nutritive part. The result is that he gets a most beautiful sparkling grain, which sells well, but, inasmuch as the covering has been removed, the grains when cooked lose their identity and become a mush. "Polished rice" is a peculiarity in America. The public can procure the unpolished rice if they will insist on the grocer getting it for them, for "polishing" is an extra process which the miller will be glad to abandon.'



WEST INDIAN COTTON.

Messrs. Wolstenholme & Holland, of Liverpool, report as follows, under date of August 28, in regard to West Indian cotton:—

Since our last report on the 14th. instant, there has been more business doing in West Indian Sea Island descriptions, and sales have reached a fair total at steady prices. There is a demand for desirable qualities, viz., 13*d.* to 14*d.*

The business includes: St. Thomas, 10½*d.* to 15*d.*; Barbados, 13*d.* to 15*d.*; St. Kitt's, 12½*d.* to 15*d.*; Antigua, 12*d.* to 15½*d.*; Nevis, 11*d.* to 14*d.*; Anguilla, 13½*d.*; and Montserrat, 11*d.*

Sea Island crop accounts from America are somewhat better but still unsatisfactory, and the general opinion is that the crop must be smaller than the last; against this it must not be forgotten that spinners hold good stocks.

COTTON PROSPECTS IN NEVIS.

Mr. J. S. Hollings, the Agricultural Instructor, has forwarded the following brief report on the prospects of the cotton crop in Nevis:—

In consequence of the severe drought, the cotton of last season was allowed to stand much longer than usual, in the hope that the second picking would result in giving a yield that would at least save the planter from actual loss on the year's expenses. But although, in some places, a plentiful show of blossoms appeared, very few bolls came to maturity, and it seems quite clear now that it was a mistake to allow the cotton to remain, and that it would have been far better to have cleared it off after the first picking was finished. Much valuable time was wasted, and the opportunity for early preparation lost, with the consequence that, when good rain fell early in May, very few were ready for planting their seed; those who had their land prepared soon had the satisfaction of seeing a nice stand of young cotton, whilst the others have had no such seed-starting rain since.

As usual there is a wide diversity of cultivation, ranging from very good to very bad, and the resulting growth shows the care, or otherwise, bestowed on the preparation of the land. The writer estimates that there are fully 1,200 acres already planted, but the fields are so scattered that it is very difficult to form an accurate estimate. The Government loans-in-aid have been allotted within the last two weeks, and this will probably enable another 500 acres to be planted, thereby bringing up the area to last year's figure or thereabout. But the fields are much more distributed over the island than they were last season, when an almost continuous block, of close upon 1,000 acres, occupied the level lands to the south and south-west of the island, and very little was to be seen at the east.

So far, the general opinion is that this season's plants are

more healthy and vigorous than last, and show a better growth altogether. The worms have already made two or three attacks but have been met promptly and vigorously with Paris green. The leaf-blister mite is also in evidence in many places, and although the greatest care is exercised in picking off the infected leaves and in dusting the plants with sulphur and lime, it can only be kept somewhat in check, it cannot be exterminated.

Last year plants were so stunted and poor in consequence of the want of rain that they did not cover one quarter of the space allotted to them, and this year, as a consequence, there are instances of what I feel sure will prove to be too close planting, not so much in the rows of cotton as between them; not only will the plant get insufficient light and air, but it will be almost impossible to pick the cotton without brushing off many bolls in passing through the rows.

So far, the weather has not been very propitious and the growth has been slow. A few acres of cotton that were planted abnormally early are now ripening their cotton, but the result does not encourage this very early planting, as many bolls fall off long before maturity.

Many attempts have been made this year to establish wind-breaks, but most have proved failures; neither pigeon peas nor Guinea corn has been of any use. It is clear that permanent wind-breaks will have to be established of wind-resisting trees such as *Lonchocarpus*, or other quick-growing but hardy trees.

COTTON PROSPECTS IN ANTIGUA.

Mr. J. Jackson, Curator of the Botanic Station, has forwarded the following brief report on the prospects of the cotton crop in Antigua:—

Owing to the dry weather experienced, cotton planting in Antigua has been retarded to a considerable extent. During the month of July, the rainfall was 3.57 inches, for the month of August, up to the date of writing, 1.25 inches.

At the present time, about 500 acres of land are planted with cotton in Antigua, and it is probable that another 1,100 acres will be planted, should the weather prove at all favourable. Twelve thousand pounds of cotton seed have been selected and distributed to the planters in Antigua by the Botanic Station. From this it would appear that it is proposed to plant a much larger area than stated above; but in some cases, many of the seeds have failed to germinate on account of the drought.

Many peasants and small holders are going in for the cultivation of cotton, and I am sorry to state that, in spite of repeated warnings, a quantity of seed has been sown that had not been disinfected or selected.

There is a small amount of leaf-blister mite on some of the young cotton, but in all the instances that have come under my observation, either old cotton was growing in the vicinity, or the seeds had not been disinfected before sowing.

COTTON PROSPECTS IN MONTSERRAT.

Mr. W. Robson, Curator of the Botanic Station, reports as follows on the prospects of the cotton crop in Montserrat:—

The outlook for the 1906-7 crop is more hopeful than in any previous year, and probably 900 acres are under cultivation, as compared with about 700 for the three previous crops. A definite planting season is now in vogue, May, June, and July being recognized as the best months. The greater portion of the crop was planted this year previous to July. No ratooning is now attempted, but the old plants are immediately burnt off as soon as the crop is reaped.

The higher lands to windward, having been planted in May, promise to give a much better yield this year; 1,770 lb. of Barbados selected seed were imported for planting, but most of the crop is from local seed.

The planting of cotton amongst newly planted limes has been successfully practised for two years without injury to the limes. Much new land is being opened up towards the south, and several smaller planters are benefiting by the Government cotton loans. Small growers, planting from ½ to 1 acre, are very numerous; they dispose of their seed-cotton locally, which pays very well.

UNITED STATES SEA ISLAND COTTON CROP.

The following is extracted from the Annual Sea Island Report of Messrs. W. W. Gordon & Co., dated Savannah, Georgia, September 1, 1906, in reference to the Florida, Georgia, and South Carolina cotton crop:—

During the past season the Florida crop was 42,437 bales, against 39,619 the preceding year; increase, 2,818. Georgia crop 67,215, against 53,112; increase, 14,103. South Carolina crop 13,712, against 11,586; increase, 2,126. Total 123,364, against 104,317; increase, 19,047. West India crop estimated at 2,300, against 1,200 bales preceding year; increase, 1,100. In weight the Carolina bale averaged 350·2 lb., against 352·5 lb.; the Florida bale 377 lb., against 401·6 lb.; the Georgia bale 408 lb., against 401·6 lb. The average price of Carolinas was about 27½c. per lb., equal to \$96·30 per bale, against 27c. per lb. last year, equal to \$95·17 per bale. Floridas and Georgias averaged 18c., making the value of Floridas \$67·86 per bale, and of Georgias \$73·44, against an average for Floridas and Georgias of 21·27c. per lb. last year, equal to \$85·45 per bale.

The season of 1905-6 presented many unusual features. The largest crop on record was produced; it exceeded the largest previous crop by nearly 20,000 bales, or about 20 per cent. The quality was poor, and the preparation was undesirable. Florida cotton in particular was complained of on account of the large percentage of short-staple cotton mixed with the better staple.

Ginners found it impossible to grade the seed-cotton properly before ginning, because the scarcity of labour caused many fields to be neglected until the bottom, middle, and top bolls were all open at the same time, and the pickers stripped each plant as they came to it, with the result that different qualities of staple were mingled together before the seed-cotton ever reached the gins.

In spite of the unusual size of the crop and its poor quality, prices were maintained on a fairly satisfactory basis throughout the season, and, for the first time in the history of Sea Island cotton, a crop of over 100,000 bales was consumed, with prices, even for the lowest grades, ranging

above 15c. Heretofore, in large crop years, it has been necessary to sell 15,000 to 20,000 bales of the lowest grades at from 11c. to 13c., in order to stimulate a demand for these qualities.

The small crop of extra-stapled Upland cotton produced in the Mississippi Valley, the high prices paid for it, together with the small crop and high prices prevailing in Egypt, caused an abnormal demand for Sea Island cotton, and the absorption of the large and undesirable crop at relatively high prices.

NEW CROP.

The acreage of the crop of 1906-7 is smaller than that of the previous season, and the crop has encountered very unfavourable weather from the start. From June 1 to August 1, excessive rains visited the Sea Island belt almost daily. The weather during the month of August has, on the whole, been favourable, but the damage done by the June to July rains cannot be entirely repaired. Mills using Sea Island, extra-stapled Upland, and Egyptian cottons are enjoying a prosperous trade, and it is likely that there will be a healthy demand for Sea Island cotton throughout the season, unless exorbitant prices at the outset check the consumption.

FLORIDA, GEORGIA, AND SOUTH CAROLINA CROPS, 1894-1906.

The same report gives the following figures relating to the crops of long-staple cottons, which are of considerable interest:—

Season.	Total crop. (1)	South Carolina crop.	Total exports.	American consumption.
	Bales.	Bales.	Bales.	Bales.
1905-6	123,364	13,712	34,103	90,484
1904-5	102,668	12,171	31,810	72,153
1903-4	76,709	9,359	31,320	43,578
1902-3	102,634	12,497	54,082	50,524
1901-2	78,621	8,760	31,873	43,650
1900-1	86,115	8,369	31,988	55,422
1899-1900	97,555	7,810	46,286	49,543
1898-9	67,204	5,623	35,466	38,654
1897-8	76,119	10,211	42,130	34,140
1896-7	103,516	11,039	58,431	40,670
1895-6	93,187	10,010	50,063	40,530
1894-5	74,839	5,913	40,741	34,981

(1) For Florida, Georgia, and South Carolina.

An analysis of these figures discloses a number of interesting points:—

During the twelve years covered by the table the total crop of Florida, Georgia, and South Carolina cotton has increased from 74,839 bales to 123,364 bales (the largest crop on record), or an increase of over 60 per cent.

During the seasons 1894-5 to 1897-8 the total exports considerably exceeded the American consumption. From the latter season onward, the home consumption has exceeded the export to a gradually increasing extent. In 1894-5, 54 per cent. of the total crop of Florida, Georgia, and South Carolina cotton was exported. Last year the exports were only 26 per cent. of the whole crop. While the total exports have declined from 40,741 bales in 1894-5 to 34,103 bales last season, the American consumption has increased from 34,981 bales to 90,484 bales in the same period.

The South Carolina crop in 1894-5 amounted to 5,913 bales, last year it was 13,712 bales.

On the average, over the twelve seasons, the United Kingdom has taken 90 per cent. of the total exports.

EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming, should be addressed to the Commissioner, Imperial Department of Agriculture, Barbados.

All applications for copies of the 'Agricultural News' should be addressed to the Agents, and not to the Department.

Local Agents: Messrs. Bowen & Sons, Bridgetown, Barbados. *London Agents:* Messrs. Dulau & Co., 37, Soho Square, W., and The West India Committee, 15, Seething Lane, E.C. A complete list of Agents will be found on page 3 of the cover.

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NOTES AND COMMENTS.

Contents of Present Issue.

The editorial in this issue consists of a review of the address of the President of the Chemical Section of the British Association, dealing with the relationship between science and the development of Great Britain's colonial possessions.

Notes on the sugar industry (p. 291) deal with the 1906 cane farmers' crop in Trinidad and the cultivation of the sugar-cane in Queensland and Louisiana.

The rice industry has made great progress in Louisiana and Texas; in 1905 there were estimated to be 432,286 acres under this cultivation in the two states. So far, the bulk of the production is consumed within the United States.

Notes will be found on p. 294-5 dealing with the prospects of the cotton crops in Nevis, Antigua, and Montserrat; also interesting statistics relating to the Sea Island cotton crop in the United States.

An illustrated note on the nutmeg tree will be found on p. 299; this is followed by instructions as to planting camphor trees.

Two recently issued reports of this Department are reviewed on p. 302, viz., on the Experiment Station in the Virgin Island and on the Botanic Station, Agricultural School, and Experiment Plots in Dominica.

Fruit growers are likely to be interested in the account of a cheap canning outfit (p. 303), which indicates that many fruits may be profitably preserved in this manner at a very small initial outlay.

Selection of Cotton Seed.

Messrs. W. W. Gordon & Co., Cotton Factors, of Savannah, Georgia, have issued, in circular form, a reprint of the editorial in the *Agricultural News* (Vol. V, no. 112) entitled 'Improvement of Cotton by Seed Selection,' with the following note:—

'We distribute this information as being of general interest to those engaged in planting and spinning Sea Island cotton. Sea Island cotton produced by planters in the West India Islands will eventually displace cotton grown in the United States, unless the planters in this country exercise equal care and discrimination in the selection of their seed for planting purposes.'

Orange Planting in Dominica.

Some idea of the extent to which orange trees are being planted in Dominica may be obtained from the fact that, during the year ended March 31 last, 1,831 budded orange plants and 402 sour orange plants for stocks were distributed from the nurseries at the Botanic Station. Since the work of budding oranges was undertaken at the station 6,000 budded orange plants have been sent out. This number is sufficient to plant, at a distance of 20 feet, 60 acres. The actual area planted is, however, considerably greater than this, as growers have themselves imported budded orange plants from Jamaica. Nearly all the plants sent out have been Washington Navels.

'It is hoped,' says the Curator in his Annual Report, 'that the planting of budded standard varieties will continue. These kinds command a higher price than ordinary seedling oranges, and the fact that budded plants produce a crop in half the time that seedling plants take is alone sufficient recommendation for the former.'

Instruction in Budding and Grafting.

A large proportion of the time allotted to field work at the Dominica and St. Lucia Agricultural Schools is devoted to the operations of budding and grafting.

Instruction of this character is an important feature of the work of these agricultural schools and is of considerable value. Boys who are capable of budding successfully fruit and other trees, are likely to experience little difficulty in obtaining employment on estates, as the advantage of budded and grafted plants over seedlings is becoming more and more appreciated by fruit growers in the West Indies.

Most of the boys at the Dominica Agricultural School are now proficient budders; 692 plants were successfully budded by them during the last year. The Officer-in-charge keeps a book in which he enters, in one column, the number of buds inserted by each boy, and, in another column, the number of successful buds. In this manner it is possible to ascertain, at the end of the season, each boy's percentage of successful buds. At the same school thirty plants of the 'Julie' mango have been grafted, while mango stocks have been raised in beds and bamboo-pots for future work.

At the St. Lucia Agricultural School 550 budded orange plants were raised last year by the boys.

Lime Planting in Dominica.

The Curator of the Botanic Station in Dominica reports that the demand for lime plants has become so great that it is no longer possible for the station to furnish the number required.

During the past six years over 200,000 common lime plants and 12,000 spineless lime plants have been distributed from the station. It is not difficult to make a rough calculation of the area thus planted with lime trees. After allowing a percentage for failures, this number is sufficient to plant, at 15 feet apart, 1,000 acres.

During the year 1905-6 over 41,000 lime plants (including 5,970 of the spineless variety) were sent out from the station.

The time has now arrived when established plantations should organize their own nurseries and so allow the Botanic Station supplies to be reserved for new settlers.

Banana Growing in Queensland.

The banana has thriven in this state, says the *Queensland Agricultural Journal*, for some fifty years. The principal varieties grown are the Cavendish, Sugar, and Ladies' Fingers.

The Cavendish banana, a Chinese variety, is the one most universally grown in Queensland and Fiji. It was introduced by missionaries, first into Fiji, from the Duke of Devonshire's conservatories at Chatsworth, and from Fiji to the Tonga Islands, and thence to Queensland. It now forms a very important item amongst the exports of North Queensland, where it thrives admirably and is grown on a fairly large commercial scale.

Apparently but little attention is paid to cultivation in Queensland, when once the plants have begun to bear, and in this connexion the writer of the article under review makes useful suggestions. The stalks that are left lying about in the grove form a breeding place for insect pests. It is suggested that these should be removed to a heap or pit. Then again, it is desirable that superfluous suckers should be removed to admit light and air, and to prevent the hiding of insects. It is necessary also that the bearing of the fruits should be regulated by the intelligent pruning of suckers.

Rubber in Uganda.

The presence of *Funtumia elastica*, the Lagos silk rubber tree, in Uganda, was unknown until 1903, and therefore the report of Mr. M. T. Dawe, Officer-in-charge of the Forestry and Scientific Department, on a botanical mission through some of the forest districts of the protectorate in 1905, to determine the distribution of *Funtumia* and of other important rubber plants, is of considerable interest.

Three important sources of rubber in Uganda were found, viz., *Funtumia elastica*, *Clitandra orientalis*, and a new species of *Landolphia*, viz., *L. Dawei*. The first is only sparsely distributed, but, in the districts visited, it appears to be the most common in the Budongo forest, except in such localities

where the large Muhindi tree (*Cynometra Alexandri*) predominates. This tree is very common in the forests of the protectorate, but it usually represents a dry district where conditions are not particularly suitable for rubber.

The other two are rubber-yielding creepers and give excellent vine-rubbers. *Landolphia Dawei* existed in almost all the swampy districts visited and proved to be the most widely distributed rubber-yielding plant in the protectorate. It gives an excellent first-class rubber and, therefore, is a plant of considerable economic importance. It is interesting to note that the rubber vines are never found with the Muhindi tree, which shows that they thrive only in comparatively damp localities.

The discovery of so large a distribution of rubber-yielding plants throughout Uganda is of considerable importance, when rubber is of such great commercial value, and the fact that *Funtumia elastica* is indigenous to many localities shows that conditions of climate and soil are suitable for its cultivation.

Nitrogen in Rainfall.

A paper in the *Journal of Agricultural Science*, Vol. 1, part 3, by Dr. N. H. J. Miller, discusses the amounts of nitrogen as ammonia and as nitric acid in the rainfall collected at Rothamsted.

Since January 1888 the ammonia in the Rothamsted rainfall has been regularly determined each month. Nitric nitrogen has been determined uninterruptedly since September 1886. The average amount of nitrogen in the forms of ammonia and nitric acid during the thirteen harvest years, 1889 to 1900-1, was 3.84 lb. per acre per annum. The amounts of nitrogen in the monthly samples of rain depend partly on the temperature and partly on the amount of rain, being least in February and greatest in August, when, in addition to an increased temperature, there is also a large amount of rain.

The amount of total nitrogen in the Rothamsted rain is compared with the amounts found in other parts of the world. It appears, contrary to expectation, that the total nitrogen may vary enormously under apparently quite similar climatic conditions, differences of climate not being necessarily coincident with great variation in the composition of the rain. Thus, the 102 inches of rain which fall in British Guiana do not supply to the soil more, but rather less, nitrogen than the 27 inches at Rothamsted.

In non-tropical rain the ammonia is greatly in excess of the nitric acid, while the rain collected in British Guiana and Barbados contains a large excess of nitric acid over ammoniacal nitrogen, which is attributed by Professor Harrison to the prevalence of violent thunderstorms; for it must be stated that this condition is not uniformly the case in tropical countries.

It is evident from the results that tropical rain does not supply to the soil an essentially greater amount of nitrogen than the rain of temperate climates, the average total nitrogen for tropical countries is only 3.58 lb. per acre, with a high average rainfall of 68.3 inches.



INSECT NOTES.

Insect Pests in St. Kitt's-Nevis.

At a special meeting of the St. Kitt's Agricultural and Commercial Society, held on August 29, at which his Excellency the Governor (Sir Bickam Sweet-Escott, K.C.M.G.) presided, Mr. H. A. Ballou, M.Sc., Entomologist on the staff of the Imperial Department of Agriculture, gave a short address on the treatment of the insect pests of cotton and other crops.

The following summary of Mr. Ballou's address appeared in the St. Kitt's *Daily Express*, of August 30 :—

Mr. Ballou discoursed on the necessity of applying the remedies advised by the Department of Agriculture to check the ravages of insect pests. He mentioned that in Nevis there was a tendency on the part of planters of cotton not to carry out properly the instructions given to rid the cotton of the insects. He instanced the fact that he had been told by more than one planter that the use of the remedies had not afforded the relief claimed, because, said they, after using the remedies for the leaf blister mite on the old leaves, it invariably appeared on the new ones. He pointed out that the mite was inborn in the enfolded buds, and so soon as the leaves unfolded, the mite showed itself. Persistent application of the remedies was essentially necessary for satisfactory results. He remarked on the habit of planting in one hole two, three, four, and sometimes five seeds, with the result of unhealthy weaklings struggling for existence, when it would be more to the advantage of the planter to have one vigorous plant in each hole.

Mr. Ballou mentioned that in St. Kitt's he had visited a field of sugar-canes that had been attacked by ants or lice, as they were sometimes called. No nests were to be seen, but the insects had eaten through every stool of canes, and had thoroughly destroyed a field of about 4 acres. He recommended that the field should be planted in cotton, as he believed that it was less likely for these insects to attack cotton plants than sugar-canes.

Paris Green for Cassava Caterpillars.

Mr. J. C. Moore, Agricultural Superintendent in St. Lucia, has forwarded the following note on the use and application of Paris green against cassava caterpillars :—

Early this month a report reached me of unusual and very destructive attacks of caterpillars in fields of cassava, in the vicinity of Union. I immediately paid a visit of inspection to the affected district, and found caterpillars, about 3 inches in length and highly coloured, feeding most voraciously on the leaves and buds of the cassava plants, completely defoliating large patches. In some fields I estimated the damaged areas to be nearly an acre in extent, and they presented brown patches, which, amidst the green surroundings, were readily distinguishable from considerable distances.

On one plot, where the attack had just commenced, the use and application of Paris green, as used for the cotton worm, were demonstrated in the presence of several planters of cassava and the pupils of the Agricultural School. It was observed on the following day, that the caterpillars in the dusted portion of the field were dead, the attack being effectually checked.

Several people owning cassava plots have since obtained supplies of Paris green for dealing with any further attacks of the pest. I have offered the loan of our dusting machine to responsible parties. This machine is Legget's Champion Dry Powder Gun, and is most useful, being readily adapted to dust low or tall plants, either singly or in rows. Two rows of cotton plants can be effectively and simultaneously dusted, at a slow walking pace, and with a minimum expenditure of energy.

The identification of the insect causing the trouble reported upon will, no doubt, receive attention from Mr. Ballou, the Entomologist on the staff of the Imperial Department of Agriculture, on the occasion of his approaching visit.

LAND AVAILABLE FOR COTTON GROWING IN THE BAHAMAS.

The Secretary of State for the Colonies has forwarded to the Imperial Commissioner of Agriculture a memorandum by the Surveyor General in the Bahamas respecting land available for cotton cultivation in that colony.

The following summary of Mr. Miller's memorandum is published for general information :—

According to the latest Blue Book returns, there still remain 1,767,362 acres of ungranted Crown land in the colony. This is distributed throughout the islands, as there is still vacant land on all the principal islands.

It is possible to obtain 1,000 acres of land in one block, but I do not know of any tract of that size on which the land can be called good throughout; certainly not possible of being ploughed and cultivated to a depth of 2 to 3 feet. Ploughs are not used in the colony owing to the rocky nature of the land.

At Inagua there is a large extent of open sandy land called 'prairie land.' Doubtless it would be possible to plough this, but the land only produces a rough grass, and I should not think it suitable for cotton growing.

Also along most of the sea coasts there is a narrow ridge of sand which could be ploughed, but I should not consider this suitable land for cotton growing.

The price of vacant Crown land is 16s. 8d. per acre. Some tracts of land have been leased at an annual rental of 1s. per acre.

The island of Mayaguana was surveyed in 1891 with a view to ascertaining its adaptability to sisal growing. The area of this island is given as 61,310 acres, of which less than one-third is suitable for cultivation.

Generally, I believe that many spots of Crown land can be found suitable for cotton growing, but I do not think that so large a tract as 1,000 acres can be found in one piece.

Cotton has been extensively grown in the islands in the past, and is still cultivated in a small way.

This colony has been so long settled, and the price of Crown land so cheap, that all the best land has already been alienated from the Crown. Land can, however, be purchased from private owners at reasonable rates.

NUTMEG.

The nutmeg tree (*Myristica fragrans*), the fruits of which are well shown in the accompanying illustration (fig. 18), furnishes the nutmeg and mace of commerce. Most of the members of the natural order *Myristiceae* have aromatic properties.

This beautiful tree, which grows to a height of 20 to 25 feet, is a native of the Moluccas, but has been introduced into many other parts of the tropical world, including the West Indies.

The fleshy fruit resembles the peach in appearance. When ripe, the fleshy exterior portion splits into two, as



FIG. 18. NUTMEG.

(From *The Book of Trinidad*.)

shown in the figure, disclosing the solitary seed (nutmeg) covered by a beautiful scarlet aril, which is the mace of commerce.

The nutmeg tree is dioecious, that is, male and female flowers are borne on different individuals. As it is impossible to tell whether a tree is 'male' or 'female' until it flowers, the expense and time involved in caring for a large number of unproductive trees are lost. The importance of experiments in grafting nutmegs (see *Agricultural News*, Vol. I, p. 69) is therefore apparent.

The chief source of the world's supply of nutmegs is the Banda Islands, which export annually about 560,000 lb. to the United Kingdom, and 500,000 lb. to the United States. Nutmegs are also largely exported from the Straits Settlements, Réunion, Java, and other places.

In the West Indies the cultivation of nutmegs is carried on principally in Grenada. The exports from that island in 1904 amounted to 5,908 cwt., of the value of £28,402.

CULTIVATION OF CAMPHOR.

The *Tropical Agriculturist*, for July, publishes the following instructions, issued by a Japanese Supply Company, in reference to the cultivation of camphor trees:—

Seed-bed.—Prepare in well-fertilized and rich soil. Plough 18 inches deep, break the lumps finely, make dikes 2 feet apart for drainage and press the surface smoothly. Mid-spring is the time of the sowing season or when the temperature ranges above 50° F. The seeds being sown, cover them up by means of a sieve through which soil is allowed to fall to about $\frac{1}{2}$ inch, and press the top lightly. Straw or hay should be spread over the bed so as to protect the seeds from being washed or blown away by storms, and also to prevent its getting too dry until they sprout, care being taken to keep the straw in place by sticks fixed into the ground.

For 1 lb. of seed a space of 6 square yards is usually allotted, but the more sparsely sown the better for the growth. One pound produces 2,000 plants on the average, but much naturally depends upon the state of a crop.

Manure should be given in summer and autumn. In Japan decomposed ordure mixed with oil cake is used in fluid form, but bone-dust or any similar manures will answer the purpose. No shading is required against the sun except on very hot days; water should be given in the evening. Clear off the weeds as they appear.

Transplanting.—Next spring, after a year, the plants should be removed. Prepare the plantation in the same manner as the seed-bed, but the stems should be cut off at 1 inch or 2 inches from the base and also the ends of the roots. About twenty plants are to be planted on 1 square yard for another year's culture. Manure in spring, summer, and autumn as in the first season, tilling the ground and weeding occasionally.

Second transplanting.—In the spring of the third year the plants are ready to be removed to permanent quarters. Treat the plant in the same way as in the first transplanting by cutting off the top and roots. If they are to be planted on hills or moorlands provide a space of 4 square yards for a tree, otherwise 7 or 8 feet apart from each other. The second transplanting may sound useless waste, but it is a method widely practised in a certain province. This may not be absolutely necessary to follow, and the plant can be left two or three years before being removed to its permanent quarters, but its nature is that it does not easily get acclimatized, so the double precaution may save much in the end. Camphor can be extracted from the stems as well as the leaves. The wood of the camphor tree is much employed in Japan for the manufacture of cabinets, chests of drawers, ward-robes, boxes, etc. Old ones have a fine close ring grain, a clear yellow-brown, silky sheen, and a beautiful appearance, so that it is well adapted for veneering. Not being subject to the attacks of insects, it is very useful for such works; besides the odour of the wood imparts a delightful fresh scent to the articles stowed in the receptacles.

Apart from its economic value the plant has an occult hygienic property. Giant camphor trees, of several centuries old, are invariably to be met with in the precincts of temples and shrines of the southern section of Japan; and the people feel from traditional instinct a sacred sentiment towards the tree, but science has revealed the truth that it serves as a natural purifying agency against any pestilential atmosphere. Its evergreen nature, lustrous dense foliage, mighty form, extraordinary longevity, and aromatic properties are the features highly recommendable wherever climatic and topographical conditions agreeable to its growth exist.



GLEANINGS.

During the fortnight ended August 16, 36 bales of West Indian cotton were imported into the United Kingdom. (*West India Committee Circular*.)

The Lawes Agricultural Trust has issued a convenient little 'Guide to the Experimental Plots,' of the Rothamsted Experimental Station, price 1s. net.

There is a steady demand in Dominica for grafted mangos, 123 plants, grafted by approach on seedling stocks, being sold at the Botanic Station during the year 1905-6.

Mr. H. Hesketh Bell, the new High Commissioner of Uganda, has decided to plant 250 miles of the Uganda roads with rubber trees. It will be remembered that this system of road-side planting was started in Dominica during Mr. Bell's régime.

There is a very good demand for sugar throughout Canada at the present time, quite large quantities being used in the fruit canneries. Last year's pack was curtailed somewhat by the high price of sugar, but this year it will be quite large. (*Maritime Merchant*, August 23, 1906.)

An exhibition of India-rubber is to be held next month in the Royal Botanic Gardens, Peradeniya, Ceylon, the object being to encourage further the growth of rubber in the island. It is thought that both Ceylon and the Malay States may soon become important sources of supply of rubber. (*Nature*, August 16, 1906.)

Referring to a note in the *Agricultural News* (Vol. V, p. 233), on a new fruit-canning factory in Jamaica, the *Maritime Merchant* says: 'The trade of Canada handles considerable preserved pine-apples, and there is no reason why it should not handle more. Hitherto, the supply has come principally from Hawaii.'

The Local Instructor for Montserrat reports that from December 1905 to the end of July last 138,296 lb. of cotton had been shipped, as against 70,788 lb. for the crop of 1905. Estimating the area of cotton last year at 700 acres, the yield shows an average of 200 lb. per acre. It is thought that about 900 acres will be planted in Montserrat during the present season.

Mr. J. H. Hart, F.L.S., Superintendent of the Royal Botanic Gardens in Trinidad, has forwarded to the Imperial Commissioner of Agriculture seeds of a palm 'which will probably turn out to be a new species of *Cocos*. The seed is from a tree, which has been grown from seed originally collected on the mainland, and is now fruiting at the Government House Gardens.'

From a discussion of the results of recent work relating to the assimilation of free nitrogen by fungi, Heinze (*Annales Mycol.*) comes to the conclusion that elementary nitrogen is not assimilated by fungi other than bacteria. (*Botanical Gazette*, August 1906.)

A correspondent has pointed out that the table, published in the last issue of the *Agricultural News* (p. 285), relative to rainfall at Grenada, might be misleading to a stranger to Grenada. The Richmond Hill station is only 506 feet above sea-level. The rainfall at higher elevations in Grenada is much greater than that shown in the table referred to.

The Vere Estates Company, Ltd., to the central factory scheme of which reference was made in the *Agricultural News* (Vol. IV, p. 258), is proposing to plant cotton in the Vere district of Jamaica on a fairly extensive scale. Land has been cleared, and the company is arranging to put in as much cotton as possible before the October 'seasons.' The services of a cotton planter from Barbados have been secured by the company.

A few very fine apples continue to be produced each year by a tree planted by Mr. Snyder, seven years ago, at the St. Elmo estate, Dominica. (See *Agricultural News*, Vol. II, p. 28.) A fruit gathered from this tree a few days ago measured 11½ inches in circumference, and weighed 10½ oz. The apple is known as the Gravenstein variety, and was imported from Canada. It is growing at an elevation of over 2,000 feet.

The cotton crop report of Messrs. W. W. Gordon & Co., of Savannah, Georgia, dated August 20, 1906, states: 'There has been too much rain in some sections of the South Carolina Islands, resulting in serious damage. Favourable weather conditions from now until the end of the season can improve the situation materially. In general, the prevailing impression seems to be that, with perfect seasons, a crop of 80,000 to 90,000 bales can still be realized. Excessive rain will prove injurious, and extremely hot weather, with dry scorching winds, will cause shedding and damage to the crop.'

In reference to the note in the last issue of the *Agricultural News* (p. 283) on the Litchi, it may be of interest to state that, according to a recent report on 'Agricultural Investigations in Hawaii, 1905,' this fruit, in a dried form, 'is becoming more extensively known in the markets of the United States, and the successful efforts to grow the trees in Hawaii indicate the possible success of more extensive plantings. The dried fruits from China sell in the Washington market for about 50c. a box, containing about 1 quart, and the demand for the very limited production in Hawaii is such that the price is very dear.'

It is stated in the *Proceedings* of the Agricultural Society of Trinidad, that Mr. George S. Hudson, of St. Lucia, had forwarded 'some Immortel seed of the variety found most useful for shade in that colony. Mr. J. G. deGannes kindly offered to give the variety a practical test and report later. The result of the experiment will be watched with interest.' It may be mentioned that this species (*Erythrina indica*) is a low tree with an umbrella-shaped crown, and Mr. Hudson is of opinion that it will be found to give better results as a shade tree for cacao than the ordinary Immortel. With this tree planters will better be able to regulate their shade.

DEVELOPMENTS OF SCIENCE.

The *Florists' Exchange* has the following note on the influence of recent scientific developments on the practice of horticulture and agriculture:—

Seed growing has had its new birth as well as other operations in the arts and sciences—a new birth noticeable to every one in improved implements and tools, all great labour-savers, but best illustrated by noting the development along scientific lines, as for example: (1) The use by seedsmen of carbon bisulphide and hydrocyanic acid gas in killing the weevil in seeds; also in killing under-surface insects and grubs; (2) in spraying garden plants to stop, on the one hand, insect ravages, and, on the other hand, the extension of fungous diseases; (3) the use of electric light as introduced in France to force a night-time growth of vegetables cultivated in forcing houses, a growth equal to 10 per cent. additional development and precocity; (4) the practice of nitroculture in connexion with plants of the *Leguminosae* family, an inoculation with commercially-made cultures of nitrogen-fixing bacteria, much advancing the immediate development of peas and beans and laying up a store of stimulating food for succeeding crops; (5) the artificial passage of electric currents by some German experimenters through the length and breadth of plant beds in vegetable forcing houses for the purpose of stimulating increased cellular action, equal, it is said, to 10 per cent. development; (6) the use of chloroform to produce an intense rest which makes it quite possible subsequently, by the application of moisture and heat, to gain sixty days' advancement in the blooming of flowering and fruit plants; (7) the use of electric air currents to stimulate the growth of garden and field crops, a gain of 20 to 60 per cent.; (8) the electrocution of insects feeding upon vines and plants both on their above and underground surfaces, particularly applicable in the case of grapes, roses, and fruit trees; (9) and among the latest scientific developments in connexion with agriculture is the extraction and holding by mechanical and chemical means of atmospheric nitrogen, and its subsequent incorporations with other things in the making of a commercial fertilizer, the air offering a limitless mine, out of which to collect the most important of all plant stimulants. This generalization indicates that the higher practice of agriculture and horticulture, of which the seed grower is the first exponent, has already become one of the sciences.

SPREAD OF FUNGUS DISEASES.

The *Journal of the Board of Agriculture* for August contains an interesting article upon the 'Spread of Fungus Diseases by means of hibernating mycelium.' It points out that, until lately, it was assumed that fungi could only be reproduced by means of spores, concentrated masses of mycelium called sclerotia, or by means of a mycelium that travels for considerable observed distances through the soil.

In the *Agricultural News* (Vol. V, p. 41) it will be observed that hibernating mycelium was known to occur in tubers and cuttings, used in the place of seed; but recent research has shown that seeds themselves may become invaded by mycelium, which not only spreads with the growing plant but also enters into its offspring to produce a race of infected plants.

This discovery suggests that probably many sudden epidemics of fungus diseases are due to the presence of this hibernating mycelium, which spreads rapidly throughout the

host plants, when the weather conditions are favourable for its development, and unfavourable for a strong vigorous growth of the host.

Experiments have been conducted which show that weather conditions are of much more importance in the appearance of epidemics of fungus diseases than was previously suspected. This shows that the life-histories of the fungi which cause diseases must be fully worked out before reliable remedial measures can be suggested, and seems to point that much success is to be looked for in the future in the raising of disease-proof varieties. Such work must necessarily be continuous, for parasitism in fungi is generally admitted to be an acquired habit. If, therefore, it is easy to change the host, the fungus may just as easily change its habit and adapt itself to new conditions.

The spread of many fungus diseases has been helped along by the importation of seed from infected areas, and the necessity of only importing seed from unaffected areas cannot be urged too strongly. This is a subject worthy of the consideration of West Indian planters, where interchange of cotton seed and of cane cuttings is common, and the carrying out of the recommendations of this Department, with reference to the disinfection of cotton seed and the treatment of cane cuttings (*Agricultural News*, Vol. IV, p. 101, and Vol. V, p. 119) should be continued.

FUNCTION OF SILICA IN THE NUTRITION OF CEREALS.

A paper on the above subject, by Mr. A. D. Hall and Mr. C. G. T. Morrison, was read before the Royal Society on February 1, 1906.

In the introduction it is shown that this subject received the attention of deSaussure, Liebig, Way, Sachs, and Jodin. Silica was considered an essential element in plant nutrition until Sachs succeeded in maturing maize plants in water cultures containing no silica, proving that silica could not be placed in the same category as phosphoric acid and potash as essential elements of plant nutrition. Also the stiffness of cereal straw had been attributed to its presence, but this had since been shown to be due to the influence of other factors.

The question of the function of silica was therefore investigated at the Rothamsted Experiment Station; field experiments were carried out in which soluble silicates were applied to barley. The results indicated that the silicate gave the plant such a stimulus as enabled it to develop more vigorously and obtain more phosphoric acid from the soil.

In 1904 the effect of phosphoric acid and silica upon the development of the barley was carefully traced. The general conclusions reached in the course of the investigations are summarized as follows:—

(1) Silica, though not an essential constituent of plant food, does play a part in the nutrition of cereal plants, like barley, which contain normally a considerable proportion of silica in the ash.

(2) The effect of a free supply of soluble silica manifests itself in an increased and earlier formation of grain, and is thus similar to the effect of phosphoric acid.

(3) The silica acts by causing an increased assimilation of phosphoric acid by the plant, to which phosphoric acid the observed effects are due. There is no evidence that the silica within the plant causes a more thorough utilization of the phosphoric acid that has already been assimilated, or itself promotes the migration of food materials from the straw to the grain.

(4) The seat of the action is within the plant and not in the soil.



VIRGIN ISLANDS: ANNUAL REPORT ON THE EXPERIMENT STATION, TORTOLA, 1905-6.

The total expenditure on this station for the year was £574 4s. 1d. The receipts from the sale of produce, amounts paid towards the purchase of lands, etc., totalled £52 1s., an increase of £10 11s. 7d. on last year's receipts from the same sources.

While the primary object of the station is the experimental cultivation of economic plants, attention has also been paid, with some measure of success, to the improvement of its appearance. The planting out of useful and ornamental trees was continued.

Plants of cacao, limes, and *Castilloa* rubber, tops of seedling canes, and pine-apple suckers were distributed from the nurseries; also some 200 lb. of Sea Island cotton seed. It is gratifying to observe that the peasants are, though slowly, realizing the advantage of planting permanent crops like cacao, limes, and rubber. Considerable interest is being taken in the cultivation of cacao. Various crops were grown in the experiment plots with fairly satisfactory results.

Reference has already been made in the *Agricultural News* (Vol. V, p. 281) to the progress that has been made in the establishment of the cotton industry.

Considering the great difficulties under which work of this kind is carried on in the Virgin Islands, it would appear that satisfactory progress is being made in the promotion of agriculture through Mr. Fishlock's efforts.

DOMINICA: ANNUAL REPORTS ON THE BOTANIC STATION, AGRICULTURAL SCHOOL, AND EXPERIMENT PLOTS, 1905-6.

Botanic Station.—The expenditure on the Botanic Station for the year under review was £708 11s. 10d. The local Government provided the sum of £150 for expenditure in connexion with nursery work and the upkeep of the ornamental grounds. The sales of plants and produce yielded £219 12s. 6d., or £46 12s. 9d. more than in the previous year.

The number of plants distributed from the station (65,731) is the largest in any year since the station was started. Last year 46,736 plants were distributed. This large increase of nearly 20,000 plants is mainly due to a great demand for lime and cacao plants.

Considerable interest attaches to the manurial experiments with cacao at the station. The report contains a summary of the results, which has been prepared by Dr. Watts. This summary should be of great value to cacao planters as a guide to the methods which are likely to give the best results. The crops gathered from the 6 acres under cacao experiments at the station have continued to show increases during the past three years. The crop for the year ended June 1906 amounted to 56 cwt.

During the year under review 72.06 inches of rain were recorded at the station. This is 7.22 inches below the average for the past twelve years. The mean rainfall for the whole island was 118.93 inches.

It is impossible to deal with all the interesting points

raised in this report. Much useful work of an experimental nature has been carried on by Mr. Jones, which is likely to prove of considerable value to the planting community. Several of the references to the cultivation of various economic plants will form the subject of separate notes in the *Agricultural News*.

Agricultural School.—The expenditure on the school during the year under review was £590, an additional £40 having been granted to meet extra expenses. The receipts (£16 14s. 9d.) from the sale of vegetables, eggs, service of stallions, etc., show a decrease as compared with last year's receipts. This is due to a falling off in the demand for the services of the stallions.

There are nineteen boys in the school. The reports of the examiner on the two half-yearly examinations were satisfactory. Every effort is being made, by means of observation lessons, to develop an intelligent interest in the school work, and the teaching is being made as practical as possible. In the field the boys have received instruction in budding, grafting, pruning, etc.; cultural experiments were carried out with a large variety of crops with more or less satisfactory results. More land is being cleared for the cultivation of crops, whereby it is hoped, in time, to make the school self-supporting.

Considerable pains have been taken by Mr. Brooks to render this institution as useful as possible by endeavouring to train up a class of intelligent young agriculturists.

Experiment Plots.—Manurial experiments with cacao were conducted by the Department at Clark Hall, Point Mulâtre, Moore Park, Picard, and Riversdale; at Corona there is an orange experiment plot, and at St. Aroment a lime plot, while the line of rubber trees along the Imperial Road has received attention.

Interesting and useful results have been obtained by the application of manures in the cacao plots. These go to show that the output of cacao can, by intensive cultivation, be quickly increased; the importance of an efficient drainage system has also been demonstrated. It is of special interest to observe that, in the case of the Picard plots, good results have been obtained with cacao in lands which were regarded as of doubtful value for cacao growing when the experiments were laid out. The surrounding fields are now being cultivated in cacao with promising results.

SCHOOL GARDENS IN JAMAICA.

The Annual Report on the working of the Education Department in Jamaica for the year 1905-6 contains the following reference to the teaching of agricultural science in elementary schools and to the establishment of school gardens:—

Many of the obstacles to the establishment of school gardens have been removed. The total amount of time to be devoted to practical agriculture has been reduced, and half of it can be given in ordinary school hours. An initial grant is now given for tools; and the requirement that application for the grant must be made and all conditions met at the inspection next before that at which the first grant is awarded has been relaxed. On the other hand, as half the time given may now be in school hours, the maximum special grant, which was only given for the time spent on the work out of school hours, has been reduced to one-half its former amount. There has been a very great increase, in consequence of the changes, in the number of school gardens; and in spite of the reduction in the individual grants, the total amount of grants may not fall off, but may even show an increase.

A CHEAP CANNING OUTFIT.

The following account of the use of a cheap canning outfit, which has been compiled from Bulletin 81 of the Louisiana Experiment Station, is likely to be of interest to fruit growers in the West Indies:—

All through the growing season, on a well-established farm, there is found an abundance of fruits and vegetables from early spring, when asparagus and rhubarb are in season, until the winter apples are gathered in late fall. The best of the fruits and vegetables may be marketed, but there is often a good deal of material which cannot be profitably sold, and frequently goes to waste. It is in the utilization of this material that a cheap canning outfit may prove profitable.

E. J. Watson, of the Louisiana Experiment Station, in a recent Bulletin, gives the results secured at that station in the canning of fruits and vegetables with a canning outfit costing but \$10. The results show what may be accomplished on many farms at little labour and expense and at considerable profit.

There are a number of these cheap canning outfits on the market, which do very satisfactory work with practically all fruits and with nearly all vegetables. The one used at the Louisiana Station had a capacity of 300 2-lb. cans and 200 3-lb. cans per day. It consisted, essentially, of a specially constructed galvanized-iron boiler, made to fit either a No. 7 or No. 8 kitchen stove, a basket or carrier that fitted inside the boiler, can tongs, and soldering irons. The station ran two of these outfits, and the expense for labour and material required to run them one day in putting up 600 2-lb. cans of tomatoes, was as follows:—

Picking and delivering fruit, two boys at 60c. per day each	\$1.20
Scalding, peeling, filling, two boys at 60c. per day each	1.20
Wiping and soldering, one man at \$1.50 per day	1.50
Processing, one man at \$1.50 per day	1.50
Six hundred 2-lb. cans, at 2½c. each	15.00
Solder for cans... ..	1.00
Total cost per day	\$21.40

The price received for the tomatoes was 70c. per dozen, or a total of \$35, which left a balance of \$13.60 to pay for the tomatoes used.

When high-grade peaches or pears were put up in 3-lb. cans, and about 1½ lb. of sugar used for the syrup in each dozen cans, the cost of labour and material for a day's work was as follows:—

For labour	\$5.40
Four hundred 3-lb. cans, at 3c. each	12.00
Fifty pounds of sugar, at 6c. per lb.	3.00
Total	\$20.40

For this grade of goods \$1.75 was received per dozen cans, or \$58.33. This left a balance of \$37.93 for the fruit used. Peaches were also put up without sugar, using simply clear water. This grade sold as pie peaches and brought \$1.00 per dozen. The station found that 'pears yielded a larger profit than peaches, other things being equal, as 1 bushel of pears filled an average of twenty-four 3-lb. cans, and 1 bushel of peaches only sixteen 3-lb. cans.' It costs as much to put up pears as peaches, and they sell for about the same price, grade for grade.

The details observed in the canning of tomatoes with this outfit are thus stated by the station:—

In canning tomatoes the first step is to scald the fruit just sufficient to loosen the skin so that it can be slipped off. To do this, we use a large iron kettle, commonly called a 'wash-pot.' The tomatoes are placed in a cheap tin vessel, holding about ½ bushel, that has been punched full of small holes, and dipped into the boiling water and allowed to remain about one minute, or until the skin will slip readily. The fruit is then peeled, sliced, and filled directly into the empty cans. The cans must be well filled for good results. This finishes the first step. The filled cans are then passed to the second stage of the operation. The tops of the cans wiped dry with a clean cloth, the cap placed on and soldered around the rim, the small hole or vent in the centre of the cap being left open. Then we are ready for the third step, that of exhausting—expelling the air from the cans. This is accomplished by submerging the cans in the boiling water (in the boiler) about two thirds of their length. They are held there until they come to a boil, or for tomatoes ten minutes. They are then removed, the small hole in the centre of the top is closed with solder, and the cans are then completely submerged in the boiling water and boiled, or processed, twenty minutes, which is the fourth and last step in the operation.

The following vegetables and fruits can be successfully canned in a somewhat similar manner: String beans, asparagus, rhubarb, okra, cauliflower, strawberries, blackberries, raspberries, peaches, pears, plums, cherries, apples, figs, etc. Corn and peas cannot be successfully preserved by this method, unless the cans are processed for three and one-half to four hours. But even then there will be many losses from swelled and spoiled cans.

CYCLONIC DISTURBANCE IN ST. KITT'S.

Mr. F. R. Shepherd, Agricultural Superintendent in St. Kitt's, has forwarded the following note on the effects of the recent cyclonic disturbance in that island:—

From Saturday, September 1, very high winds and heavy rains have prevailed here with low barometer. On Sunday morning 5 inches of rain were registered at the Botanic Station, and a heavy wind blew all day from the south-west.

No serious damage has been done in the station, only one wooden fence being blown down, three large trees turned up by the roots, and branches of trees broken off. One of these trees, a wine palm (*Caryota urens*), which was a handsome specimen some 30 feet high, I am endeavouring to replant. The others were of little value and will not be missed.

The young plants and palms in the nursery suffered no damage, but the plants generally in the station have been wind blown and will take some time to recover from the effects of the sea blast.

At La Guerite the experiment plots are not damaged. The early-planted cotton has been blown down, but I do not anticipate much loss. The fine rains which were so much needed, will result in much benefit to the island generally.

DEPARTMENT NEWS.

Mr. Thomas Thornton, A.R.C.S., Travelling Inspector in connexion with Cotton Investigations, left Barbados in S.S. 'Oruro' on Monday, September 10, on a visit to Nevis. From Nevis Mr. Thornton will proceed to St. Croix, where he will, at the request of the British Cotton-growing Association advise the Danish West Indian Plantation Company in respect to their cotton cultivation.

MARKET REPORTS.

London,—August 29, 1906. Messrs. KEARTON, PIPER & Co.; Messrs. E. A. DE PASS & Co.; 'THE WEST INDIA COMMITTEE CIRCULAR,' August 22; 'THE LIVERPOOL COTTON ASSOCIATION WEEKLY CIRCULAR,' August 24; and 'THE PUBLIC LEDGER,' August 25, 1906.

ALOE—Barbados, 15/- to 60/-; Curaçoa, 18/- to 55/- per cwt.
 ARROWROOT—St. Vincent, 1 $\frac{7}{8}$ d. to 2d. per lb.
 BALATA—Sheet, 1/5 to 2/-; block, 1/5 to 1/5 $\frac{1}{2}$ per lb.
 BEES'-WAX—£8 to £8 10s. per cwt.
 CACAO—Trinidad, 58/- to 63/- per cwt.; Grenada, 49/- to 55/- per cwt.
 CARDAMOMS—Mysore, 7 $\frac{1}{2}$ d. to 3/- per lb.
 COFFEE—Jamaica, good ordinary, 41/- to 43/- per cwt.
 COTTON—West Indian, medium fine, 6d.; West Indian Sea Island, medium fine, 13d.; fine, 14d.; extra fine, 15 $\frac{1}{2}$ d. per lb. Prices paid, 7 $\frac{1}{4}$ d. to 16d. per lb.
 FRUIT—
 GRAPE FRUIT—13/- to 16/- per box.
 BANANAS—Jamaica, 4/6 to 6/- per bunch.
 LIMES—5/- to 5/6 per box.
 ORANGES—8/6 to 14/- per case.
 PINE-APPLES—St. Michael's, 2/6 to 6/- each.
 FUSTIC—£4 to £4 10s. per ton.
 GINGER—Jamaica, 57/- to 63/- per cwt.
 HONEY—Dark to good reddish, 17/- to 22/- per cwt.
 ISINGLASS—West Indian lump, 1/9 to 2/3; cake, 1/1 per lb.
 KOLA NUTS—4d. to 6d. per lb.
 LIME JUICE—Raw, 11d. to 1/3 per gallon; concentrated, £22 10s. to £23 per cask of 108 gallons; hand-pressed, 2/6 to 2/9 per lb. Distilled Oil, 2/6 per lb.
 LOGWOOD—£4 to £4 15s.; roots, £3 10s. to £4 per ton.
 MACE—Good palish, 1/6 to 1/7; fair pale 1/5; fair red 1/3 to 1/4; broken, 10 $\frac{1}{2}$ d. to 1/1 per lb.
 NITRATE OF SODA—Agricultural, £11 15s. per ton.
 NUTMEGS—56's, 2/6; 64's, 1/3 to 1/5; 75's, 10 $\frac{1}{2}$ d.; 84's, 9 $\frac{1}{2}$ d.; 94's, 7 $\frac{1}{2}$ d.; 100's, 7d.; 108's, 6 $\frac{1}{2}$ d.; 120's, 6d.; 130's, 5 $\frac{1}{4}$ d.; 145's, 5d. per lb.
 PIMENTO—Fair, 2 $\frac{7}{8}$ d. to 3 $\frac{1}{8}$ d. per lb.
 RUM—Jamaica, 2/2; Demerara, 10d. to 10 $\frac{1}{2}$ d. per proof gallon.
 SUGAR—Yellow crystals, 15/- to 15/6 per cwt.; Muscovado, 13/6 to 14/6 per cwt.; Molasses, 10/- to 14/- per cwt.
 SULPHATE OF AMMONIA—£11 17s. 6d. per ton.

Montreal,—July 20, 1906.—Mr. J. RUSSELL MURRAY.
 (In bond quotations, c. & f.)

COCOA-NUTS—Jamaica, \$26.50 to \$28.50; Trinidad, \$25.00 to \$26.00 per M.
 COFFEE—Jamaica, medium, 10c. to 11c. per lb.
 GINGER—Jamaica, unbleached, 14c. per lb.
 MOLASCUIT—Demerara, \$1.00 per 100 lb.
 MOLASSES—Barbados, 27c. to 28c.; Antigua, 22c. to 23c. per Imperial gallon.
 NUTMEGS—Grenada, 110's, 18c. per lb.
 PIMENTO—Jamaica, 6c. per lb.
 SUGAR—Grey crystals, 96°, \$2.15 to \$2.20 per 100 lb.
 —Muscovados, 89°, \$1.65 to \$1.80 per 100 lb.
 —Molasses, 89°, \$1.45 to \$1.65 per 100 lb.
 —Barbados, 89°, \$1.60 to \$1.85 per 100 lb.

New York,—August 24, 1906.—Messrs. GILLESPIE BROS. & Co.

CACAO—Caracas, 12 $\frac{1}{2}$ c. to 13 $\frac{1}{2}$ c.; Grenada, 12c. to 12 $\frac{1}{2}$ c.; Trinidad, 11 $\frac{3}{4}$ c. to 12 $\frac{1}{2}$ c.; Jamaica, 9 $\frac{1}{2}$ c. to 12c. per lb.
 COCOA-NUTS—Jamaica, \$27.00 to \$28.00; Trinidad, \$26.00 to \$27.00 per M.
 COFFEE—Jamaica ordinary, 8 $\frac{1}{2}$ c. to 8 $\frac{3}{4}$ c.; good ordinary, 8 $\frac{1}{4}$ c. to 9c. per lb.
 GINGER—Dark scraggy root, 10 $\frac{1}{2}$ c. to 11 $\frac{1}{2}$ c.; white to bright bold, 11 $\frac{1}{2}$ c. to 14 $\frac{1}{2}$ c. per lb.

GOAT SKINS—Barbados, Dominica, and Antigua, 59c.; Jamaica, 59c.; St. Kitt's, 49c. to 51c. per lb.
 GRAPE FRUIT—Jamaica, \$5.00 to \$8.00 per barrel; \$3.50 to \$4.50 per box.
 LIMES—Dominica, \$5.00 to \$6.00 per barrel.
 MACE—31c. to 36c. per lb.
 NUTMEGS—West Indian, 80's, 20c.; 90's to 100's, 15 $\frac{1}{2}$ c.; 110's, 13c.; 130's, 11c. per lb.
 ORANGES—Jamaica, \$4.50 to \$5.00 per barrel; \$2.00 to \$2.50 per box.
 PIMENTO—5 $\frac{1}{2}$ c. to 5 $\frac{3}{4}$ c. per lb.
 SUGAR—Centrifugals, 96°, 31 $\frac{1}{8}$ c. to 4c.; Muscovados, 89°, 31 $\frac{1}{8}$ c. to 3 $\frac{1}{2}$ c.; Molasses, 89°, 3 $\frac{1}{8}$ c. to 3 $\frac{1}{4}$ c. per lb., duty paid.

INTER-COLONIAL MARKETS.

Barbados,—September 10, 1906.—Messrs. T. S. GARRAWAY & Co., and Messrs. JAMES A. LYNCH & Co., September 11, 1906.

ARROWROOT—St. Vincent, \$4.00 to \$4.25 per 100 lb.
 CACAO—\$11.50 to \$12.00 per 100 lb.
 COCOA-NUTS—\$11.00 per M. for husked nuts.
 COFFEE—\$10.00 to \$10.75 per 100 lb.
 HAY—85c. to 90c. per 100 lb.
 MANURES—Nitrate of soda, \$60.00; Ohlendorff's dissolved guano, \$55.00; Cotton manure, \$42.00; Cacao manure, \$42.00; Sulphate of ammonia, \$75.00; Sulphate of potash, \$67.00 per ton.
 ONIONS—Lisbon, \$3.00; Madeira, \$3.00 to \$3.50 per 100 lb.
 POTATOS, ENGLISH—\$3.25 per 160 lb.; Nova Scotia, \$3.50; Bermuda, \$4.25 per 160 lb.
 RICE—Ballam, \$5.80 per bag (190 lb.); Patna, \$3.30 to \$3.40; Rangoon, \$2.75 per 100 lb.
 SUGAR—No quotations.

British Guiana,—September 15, 1906.—Messrs. WIETING & RICHTER.

ARROWROOT—St. Vincent, no quotations.
 BALATA—Venezuela block, 25c.; Demerara sheet, 38c. per lb.
 CACAO—Native, 12c. to 13c. per lb.
 CASSAVA STARCH—\$4.50 per barrel.
 COCOA-NUTS—\$10.00 to \$12.00 per M.
 COFFEE—15c. per lb.
 DHAL—\$4.60 per bag of 168 lb.
 EDDOS—72c. per barrel.
 MOLASSES—No quotations.
 ONIONS—Madeira, 3c. per lb.
 PLANTAINS—12c. to 32c. per bunch.
 POTATOS, ENGLISH—Nova Scotia, \$3.25 per barrel.
 POTATOS, SWEET—Creole, \$2.00 per bag.
 RICE—Ballam, \$6.00 to \$6.25 per 177 lb.; Creole, \$5.35 to \$5.50 per bag (ex store).
 SPLIT PEAS—\$6.10 per bag (210 lb.).
 TANNIAS—\$1.92 per barrel.
 YAMS—White, \$2.16; Buck, \$3.00 per bag.
 SUGAR—Dark crystals, \$2.30 to \$2.35; Yellow, \$2.50 to \$2.65; White, \$3.65 to \$3.75; Molasses, \$1.50 to \$1.70 per 100 lb. (retail).
 TIMBER—Greenheart, 32c. to 55c. per cubic foot.
 WALLABA SHINGLES—\$3.00, \$3.75, and \$5.25 per M.

Trinidad,—September 14, 1906.—Messrs. GORDON, GRANT & Co.

CACAO—Ordinary to good red, \$15.00 to \$15.50; estates, \$16.00 per fanega (110 lb.); Venezuelan, \$15.00 to \$15.50 per fanega.
 COCOA-NUTS—\$21.00 per M., f.o.b.
 COCOA-NUT OIL—72c. per Imperial gallon (cask included).
 COPRA—\$3.70 to \$3.80 per 100 lb.
 DHAL—\$4.40 to \$4.50 per 2-bushel bag.
 ONIONS—\$2.25 per 100 lb. (retail).
 POTATOS, ENGLISH—\$1.20 per 100 lb.
 RICE—Yellow, \$6.25 to \$6.50; White, \$5.40 to \$6.10 per bag.
 SPLIT PEAS—\$5.70 to \$5.90 per bag.
 SUGAR—Grocery, \$2.25 to \$3.00 per 100 lb.



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United Fruit Company in regard to the purchase and delivery of bananas.

By this contract the planters of the colony bind themselves to plant 2,470 acres in bananas and to increase the productive area within three years to a minimum of 7,410 acres. On the other hand, the company agrees, for a minimum of 20,000 bunches, to send a boat to Dutch Guiana to buy and transport the same. At first the service will be a fortnightly one; later on, as the supply of fruit increases, boats will call weekly. The contract sets out in detail the prices to be paid for the different grades of fruit during the different months of the year. The highest prices will be paid during the months of March, April, May, June, November, and December. No doubt, every effort will be made by the planters, by the careful pruning of suckers, to get the majority of the bunches to mature during these six months.

In view of the possible establishment of a regular banana industry in British Guiana, the *Demerara Argosy*, in publishing the terms of the Surinam contract, publishes also useful information in connexion with the prospects of banana cultivation, obtained from a Jamaica banana grower who has been engaged in the trade for a number of years.

The Banana Industry.

FOR some time efforts have been made in Surinam to establish a banana industry. On p. 308 of this issue of the *Agricultural News* the details are published of a contract entered into by the Government of Dutch Guiana and the

This authority places the cost of preparing and cultivating an acre in bananas at about \$40. This estimate would appear to be rather low. The Hon. William Fawcett, in a paper on the banana industry in Jamaica, read before the West Indian Agricultural Conference of 1902 (see *West Indian Bulletin*, Vol. III, pp. 153 et seq.), places the cost at

£15 per acre in the irrigated districts and £10 on the north-side plantations. To this must be added the cost of obtaining suckers from Jamaica. These could be purchased at about £1 per 100 suckers. This, with transport charges, would bring up the cost, on the estimate of \$40, to about \$60 per acre. Below will be found an estimate of the receipts, from which it will be seen that the first year's income will practically pay for the establishment of the plantation. The probable annual expenditure for upkeep after the first year will be about \$36. The profit during the second and subsequent years may therefore be placed at from \$25 to \$30 per acre.

The statement published on p. 308 shows that during the six months already mentioned the maximum price of 35c. per 9-hand bunch will be paid to the Surinam growers; during the other months 20c. The price for 8-hand bunches will be 23c. and 13c., respectively. After the first two years the prices will be somewhat lower.

In regard to the prices paid for bananas by the United Fruit Company in Jamaica, it should be mentioned that many of the growers are under contract to supply fruit all the year round at the following rates per 100 bunches: January, £6; February, £7 10s.; March, £10; April and May, £12 10s.; June, £11 10s.; July, £7 10s.; August, £5 10s.; October and November, £6 5s.; December, £5 10s. Penalties are enforced in the event of failure to supply the stipulated quantities. Most of these contracts expire this year, and as the ruling open market price for the last two years has been considerably lower, contracts are not likely to be renewed at the above-mentioned figures. These prices are for full or 'straight' bunches (i.e., of 9 hands and over). An 8-hand bunch counts as three-quarters, a 7-hand as one-half, and a 6-hand bunch as one-fourth.

The Jamaica grower referred to above estimates that the average number of trees planted to the acre is 300. The number of saleable bunches yielded by these depends very much on the fertility of the land. On good land an average of 270 bunches should be obtained, of which 60 per cent. (or 162) should be of 9 hands and upwards, 25 per cent. (or 67) of 8-hand bunches, and about 40 7-hand bunches. After the first year it is estimated that an acre should yield 400 bunches as long as the land remains good (the grade proportions being the same as in the first year). Calculating these returns in accordance with the Jamaica system already outlined, the yield would be equivalent to 232 'straight' bunches in the first year and 345 in subsequent years.

Assuming that a contract, similar to that made by the Surinam Government, could be made by British Guiana, the *Argosy* gives an estimate of the probable revenue from banana cultivation as follows: first year, \$59.96; second year, \$89.10; subsequent years, \$86.22. In making this calculation, 'no credit has been taken for the production of a larger proportion of bunches in the months of highest prices, which is the aim of all growers of bananas under a contract such as this. It has been assumed that throughout the year the same number of bunches would be cut every month.'

It will be understood that the foregoing remarks apply to the cultivation of the Gros Michel banana the variety grown in Jamaica.



SUGAR INDUSTRY.

Seedling Canes in Mauritius.

In the Annual Report on the Station Agronomique in Mauritius for 1905, the following reference is made to the raising of seedling canes:—

As in preceding years, the station continued to raise seedling canes, and from 1,800 to 1,900 young plants have been planted out.

A certain number of cuttings of the previously selected cuttings have been distributed. The varieties distributed have already been cultivated at the station and cut as plant canes, and have been allowed to ratoon where they had given good results; they are worthy of trial on other estates, and under other cultural and climatic conditions. It is only after these further trials, for the above-mentioned reasons, that we can propagate them and extend their cultivation.

We may mention that persons desiring to obtain these varieties have only to communicate with the station, which will fulfil orders as far as the supply at its disposal will admit.

It might be mentioned that seedlings were successfully raised in Mauritius shortly after the discovery of fertile seed in Java and Barbados, a large number of which were distributed to estates. These seedlings gave such good results that managers frequently started seedling nurseries of their own, with the result that much confusion in nomenclature followed.

Although many of the seedlings have proved to be worthless, and others have shown great variability, a considerable number have been produced, which show, not only a greater saccharine content than the older varieties, but also a greater resistance to disease. In consequence, they have given a larger yield of sugar per acre than most of the older varieties.

Seedling Canes in Louisiana.

In a 'Review of Louisiana's Sugar History,' Dr. R. E. Blouin, Assistant Director of the Louisiana Sugar Experiment Station, makes interesting references to the varieties of canes grown in the state. The following is a brief summary of his remarks in this connexion:—

The first variety grown was the Creole. In 1797 the Taheite variety was introduced and supplemented the Creole in furnishing cane for the sugar planters. The introduction of the striped and purple varieties from 1817 to 1825 marks a great advance in cane varieties. These varieties soon replaced the Creole and Taheite canes and are now the chief varieties grown. In 1886 some twenty-five varieties were introduced from foreign countries, but none of them showed any superiority over the purple and striped.

Then came the introduction of seedling canes. Large numbers of these were experimented with, and the Sugar Experiment Station has distributed large quantities of two varieties, which originated in British Guiana, and were known as D. 74 and D. 95. These varieties have proved themselves eminently adapted to conditions in Louisiana. Large areas are now in these canes, and D. 74, especially, is being extended very rapidly. The reports from the plantations last season were, without exception, highly favourable to their superior merits, both in sugar content and tonnage yields. It is estimated that they will increase the sugar output at least 25 per cent. per acre and reduce materially the cost of harvesting and manufacture. They commend themselves highly, on account of their erect habit of growth, as an aid to the perfection of the cane harvester.

Dr. Blouin makes the following interesting announcement:—

'After numerous trials to germinate the seed of sugar-cane at the Sugar Experiment Station, this year we have been successful for the first time, and now have seedling canes originated in Louisiana, and hope for greater success with these.'

Ecuador.

The position of the sugar industry in Ecuador is reviewed as follows in the *Consular Report* for the years 1899 to 1905:—

The production of sugar throughout the Guayaquil district, which is encouraged by an import duty on foreign sugar of about 7s. 6d. per 100 lb., has been continued during the past five years; the sale price in Ecuador being kept up by the above-mentioned import duty. The actual sale price is, and has been for some considerable number of years, 10 sucre (£1) per 100 lb. of fine white sugar, equals 2½d. per lb. In 1904, by a miscalculation of the syndicate, an exceptionally large exportation of sugar occurred, so much so that for the months of May to August the whole republic was short, indeed almost bare of sugar. Although the syndicate did not raise the price above the 10 sucre per 100 lb., the actual consumers were bled by the middlemen, many of whom made as much as 25 to 30 sucre (£2 10s. to £3) out of the sack they bought for 10 sucre, or £1. In consequence of this, a serious attempt was made to get the import duty on sugar reduced to 2c. per kilo* (or 3s. 9d. in all per 100 lb.), so as to allow the Peruvian sugar to compete with the native product and keep the price down below £1 per 100 lb., but this project did not pass Congress.

The sugar producers, since 1902, have been making a great effort to introduce Guayaquil sugar to the markets of the interior, but, owing to the excessive cost of conveyance, were unable to do so until the opening of the railroad to Riobamba gave them increased facilities. They have taken so considerable an advantage of this that the previous importation of Colombian sugar to Quito and some of the other Andian markets has been practically stopped. The consumption of Ecuadorean sugar has been increased over 50 per cent., and the poor crop of 1905 (127,000 quintals †) was wholly consumed in the country, and the syndicate still find themselves short and will have to import from 800 to 1,000 tons. Considering that in previous years only about 60,000 to 80,000 quintals could be sold in Ecuador, and the excess had to be exported at a considerable loss, this has been a great advantage to the sugar producers, and as they can easily increase their production, the outlook for this industry in future years is distinctly encouraging.

Molasses as a Feeding Stuff.

The following note on the use of sugar foods in England is extracted from the Report from the Analytical Department, contained in the *Journal of the South-eastern Agricultural College, Wye, Kent*, for July 1906:—

A noteworthy feature this year has been the great number of sugar feeding stuffs sent in, all prepared from molasses, one of the by-products in the manufacture of sugar. Molasses is the name given to the mother liquor left after crystallization has proceeded as far as possible. It is obtained during the manufacture both of cane and of beet sugar, and contains invert sugar unavoidably formed in the evaporation process, unchanged sugar, and a quantity of dissolved salts. The average composition of beet molasses is somewhat as follows: sugar, 50 per cent.; other organic matter, 20 per cent.; mineral matter, 10 per cent.; water, 20 per cent. It has for some time been known and valued as a farm food, but there are several drawbacks connected with its use. Some of these are economic. The difficulty and cost of transporting a thick viscid liquid from the sugar factory to the farm are considerable, and it has also been found that the farm hands may use the molasses themselves. There are also physiological disadvantages; beet molasses has purging properties, from which cane sugar molasses appears to be free, and cannot be fed in any quantity to stock. It is said that either variety of molasses is bad for breeding stock, inducing sterility, especially in males.

Of recent years, various absorbing materials have been mixed with the molasses, and a fairly dry powdery substance has been finally produced. The absorbent varies in different makes, megass (sugar-cane stem), fine peat moss, lucerne hay, rice, ground maize stem all being in use, while other makers use a mixture of seeds with other substances strongly suggestive of mill screenings. The amount of sugar in the food varies from about 15 to 50 per cent.

The makers of the foods examined claim to have overcome the difficulties attending the use of raw molasses. A powdery substance is easier to handle than a liquid, and there is no fear of theft by farm hands. It is further claimed that large quantities of molasses in the form of these foods can be taken with advantage, and no injurious after-effects will follow.

* 1 kilo = 2·2 lb.

† 1 quintal = 100 lb.



WEST INDIAN FRUIT.

ORANGE INDUSTRY OF SEVILLE.

The following note on the orange industry of Seville is extracted from the *U. S. Monthly Consular Reports*:—

Consul Bartleman, of Seville, makes a report on the dwindling orange exports of that port. It would seem that this would require more oranges from other countries to supply European markets, and that the overproduction in Florida and California could thus find an outlet. The letter follows:—

'According to the *Revista Commercial*, of Seville, the disease which has raged among orangeries of this region is responsible for the retrogressive movement in the exportation of this fruit, which, although extensive in previous years, amounted in the present but to a very limited number of shipments. In the season 1900-1, 200,000 boxes of oranges were shipped from Seville by water route, every year therefore showing a greater decrease, the exportation in the present year amounting to only 88,000 boxes.'

SURINAM BANANA INDUSTRY.

A circular has been issued, says the *Demerara Argosy*, giving the following interesting information regarding a banana export industry in Surinam:—

A contract has recently been made between the Government of Dutch Guiana and the United Fruit Company regarding the purchase and delivery of bananas, and the following terms have been agreed upon both by the Government of the colony and planters combined on the one part, and the United Fruit Company on the other:—

The planters bind themselves to start planting bananas on 2,470 acres, and to increase within three years to a minimum of 7,410 acres.

For a minimum of 20,000 bunches a boat of the company will proceed to Dutch Guiana to buy and transport the same.

The service will be a fortnightly one, and later on, as the supply increases, a weekly one.

The prices for which bananas will be bought will be as follows:—

During the first two years there will be paid:—

(a) For a bunch of 9 hands, 35c. during the months of March, April, May, June, November, and December; and 20c. during the other months.

(b) For bunches of 8 hands there will be paid 23c. during the months of March, April, May, June, November, and December; and 13c. during the other months.

After the first two years for a bunch of 9 hands:—

25c. in March, April, May, and June.

30c. in November and December.

20c. in the other months.

For a bunch of 8 hands:—

23c. in March, April, May, and June.

20c. in November and December.

13c. in the other months.

For a bunch of 7 hands:—

17c. in March, April, May, June, November, and December. In the other months they are not wanted at all.

This contract has to be approved by the Netherlands Government, and the labour wanted will be imported from India.

Thirty-six hours after arrival of steamers will be given to cut and transport the bananas.

The prices quoted are American currency.

CACAO IN THE GOLD COAST.

The *Annual Report* on the Gold Coast Colony for 1905 contains the following reference to the cacao industry:—

The amount of cacao exported during the past year was less by 43,850 lb. than that exported during the previous year; the slight decrease was no doubt due to the exceptionally dry season. The cultivation of this product has been still further extended during the year under review, and it is anticipated that the yield in 1906 will exceed the production in 1904, which amounted to 11,451,458 lb. No improvement in the quality of this product is to be expected so long as the merchants continue to pay a uniform price irrespective of value. In this connexion the Superintendent of Agriculture for British West Africa, in reporting on the cacao industry, recorded his opinion that 'the great obstacle to the production of a better grade of cacao, as represented to me by the native chiefs with whom I conversed, is the position taken up by the Accra merchants, whose object appears to be to keep the products of the country in a condition of inferiority so as to prevent the growth of competition. The fact that large money advances are paid out by them (the merchants) to farmers against prospective crops is in itself a sure means of checking any inducement to improve the quality; but apart from this, where no advances had been taken, the cultivator appears to be in no better position owing to the system adopted of pooling purchases. It is clear that so long as the present conditions exist, there is little hope of improvement.'

COCOA-NUTS IN SEYCHELLES.

The following reference to the cocoa-nut industry in Seychelles, where it has superseded the cultivation of vanilla, is extracted from the *Annual Report* on the colony for 1905:—

The cocoa-nut palm grows well under almost any conditions in the Seychelles islands, and the products of the cocoa-nut palm constitute their permanent staple products. Vanilla has, for a season, brought greater wealth, and there is no reason why rubber (*Hevea brasiliensis*) should not be equally remunerative; but as a constant source of income, with an illimitable market, the cocoa-nut is the safest of all. Serious efforts have been made during 1905 to eradicate disease, and to make clear to all proprietors the uses of restoratives of the soil and the best methods of cultivation. The estimated crop in 1905 was 19 to 20 millions of nuts; but with better cultivation, the crop of 2,000 nuts an acre might be increased by 50 per cent.; the average nuts can similarly be increased in weight and oil-giving quantities, and the area under cultivation might be largely extended.

The results, however, for 1905 are already eminently satisfactory, considering that the trees have suffered from two seasons of drought, showing that the planters appreciate the vital need of improving the cultivation of the cocoa-nut palm. The crops for 1906 promise to give much higher results. About four-fifths of the total crop is exported under one form or another. The quantity of oil exported is equivalent to about 20,000 cwt., at a price equivalent to about £16 per ton. The cost of placing this oil on the London market is at present increased by 68s. per ton, the rate of freight fixed by the Messageries Maritimes; consequently, very little goes direct to Europe. The average price shows a substantial improvement over the prices in 1903 and 1904, although considerably less than the rate ruling from 1895 to 1899.

The manufacture of soap has shown a large expansion; the production is about 6,564 cwt., selling at £21 per ton. The quality of the soap is excellent, and needs only to be better known to be in wide demand. The present markets are Madagascar and the east coast of Africa.

The export of cocoa-nuts is much lower than in any previous year, but this is due to the absence of facilities for cheap shipment to Mauritius. The declared value is given at Rs. 22 [rupee = 1s. 4d.] per 1,000—a price which can be considerably augmented by their conversion into copra or oil.

The preparation of copra is a new industry, and at present prices is the most lucrative form for export. The principal difficulty in the way of this expansion is the cost and uncertainty of freight to Europe. The volume is still only 3,000 cwt., at an average price of between Rs. 16 and Rs. 17 per cwt., or £22 per ton; but with cheaper freights and some security against delay in shipment, the trade would largely increase.

There is, at present, no export of desiccated cocoa-nuts, poonac, or coir (rope, yarn, or fibre). A company has been formed at Brussels, under the title of 'Bacova' for the desiccation of cocoa-nut, banana, vanilla, and manioc at Seychelles, which will shortly commence operations. The poonac is all consumed locally. The industry of fibre manufacture was once attempted without success, and the experiment has not been revived. The fibre is not now utilized.

The total volume of cocoa-nut exports is approximately 2,275 tons, of a declared value of Rs. 414,012—a marked advance on 1904, and better than any year since 1899. It is probable that the exports for 1906 will prove the best on record.

TOBACCO INDUSTRY OF CUBA.

The following note on the Cuban tobacco industry is extracted from the *U. S. Monthly Consular Reports* for February:—

The past history of the tobacco-growing industry records no such general destruction of a tobacco crop as by the torrential rains recently. Leading planters declare that not more than from 30 to 35 per cent. of the regular harvest will be reaped, and that the leaf marketed will be very deficient in quality. The number of bales of tobacco in 1905 was 469,328, while the 1906 estimate is 160,000 bales. The latter figure will be further reduced, because the acreage in tobacco is not so large. That the 1906 crop will hardly supply even local needs is evident by the fact that Havana cigar factories alone require 100,000 bales yearly. The American smoking public will first feel the effects of the consequent higher prices because of the preference for the 'green cigar,' while European smokers value more the 'seasoned cigar.' The American preference therefore necessitates fresher stocks by manufacturer and dealer.

Appeals to the Cuban Government have come from all parts of the afflicted districts. The remedy most in favour is to render both direct and indirect aid to the devastated districts. It is proposed to execute a system of public works that will prevent a recurrence of the overflow of the rivers so destructive in some districts, in addition to giving employment to many hands that usually find work in the tobacco fields. The outlook is extremely gloomy, and the scarcity of seedlings blights the last hope of the early recouping of the losses suffered.

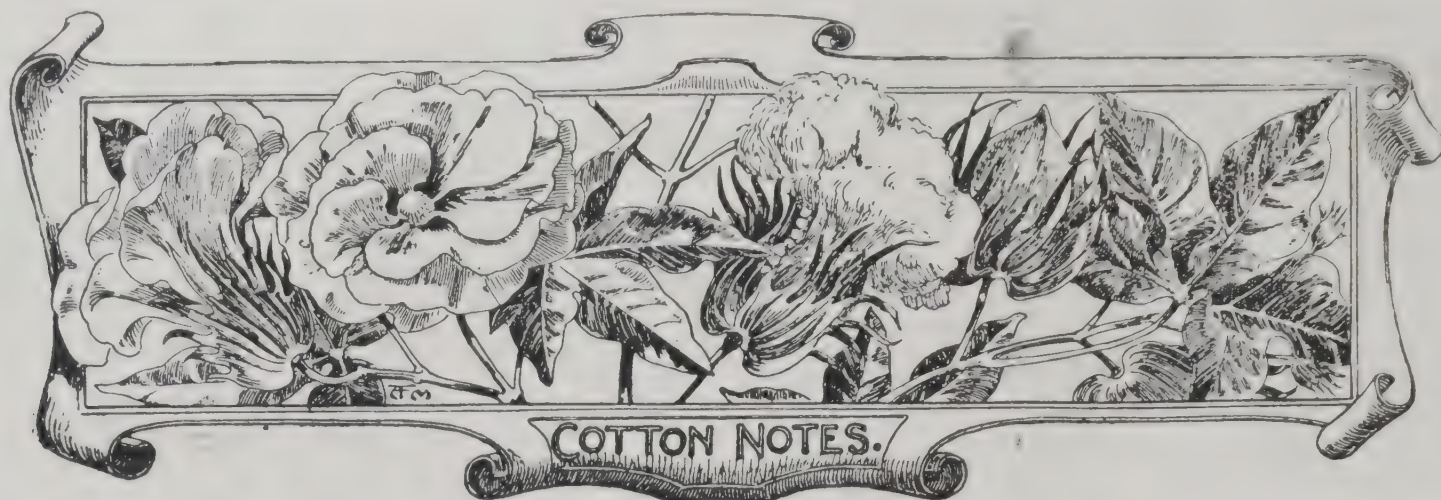
Since the above was written, the Cuban tobacco industry has suffered further disaster in consequence of the outbreak of political disturbances. It was pointed out in a recent issue of the *Jamaica Daily Telegraph* that this offered an opportunity for extending the local tobacco industry. Referring to this article, the Secretary of the Jamaica Agricultural Society wrote as follows:—

In your Saturday's issue you quoted an extract from the *Agricultural Journal* referring to the fresh opportunity Jamaica has of pushing her cigar-tobacco industry through the interruption of the Cuban trade. You pointed out in your excellent leader other opportunities Jamaica had of creating a trade in early vegetables.

I wish, however, that you had dwelt more upon the tobacco industry, because that we have established; and we have men who can grow Havana tobacco and cure it, who are familiar with all the particulars of the industry, while we have plenty of suitable land, in the same districts where tobacco is grown at present, to grow more.

In reply to Mr. Barclay, the *Daily Telegraph* stated:—

There is no reason why Jamaica should not be recognized in England as one of the foremost tobacco-producing countries in the world; or rather, there is no reason why a large percentage of the supplies of tobacco leaf for the English market should not be drawn annually from this island. Experience has proved that the soil of Jamaica is in no degree inferior to that of Cuba (with the possible exception of a far-famed valley near Havana) from the point of view of tobacco production. The flavour and aroma of the Jamaica leaf are quite as good as those of the tobacco grown in the neighbouring island, and if all our cultivators were as expert in the art of curing as most of the Cuban producers are, the expansion of the industry would not only be a possibility but an actuality.



WEST INDIAN COTTON.

Messrs. Wolstenholme & Holland, of Liverpool, have forwarded the following report on business in West Indian cotton from August 28 to September 11:—

Since our last report, about 300 bales of West Indian Sea Island cotton have been sold at steady prices.

Being late pickings, they were mostly inferior in quality, and include St. Kitt's, 11d. to 12½d.; Nevis, 10d. to 13d.; Antigua, 14d. to 15d.; Montserrat, 14½d.; Carriacou, 10d. to 14½d.; and stained cotton from various islands at 5d. to 8d. per lb.

American crop accounts continue poor, and we expect, that, whatever the quantity may be, the quality will be poor, and this should help the West Indies, if the lint is clean and bright.

COTTON IN THE WEST INDIES.

The following is an extract from an article entitled 'The Story of the British Cotton-growing Association' contributed by Mr. John C. Atkins, Secretary of the Association, to the *Magazine of Commerce*:—

Formerly these islands grew a considerable amount of cotton. This was displaced by sugar, and the industry gradually died out, except in one or two islands, where a quality somewhat similar to American was produced in small quantities. Due largely to the efforts of the Association, loyally backed up by Sir Daniel Morris, Imperial Commissioner of Agriculture, and his assistants, the attention of the planters has once again been directed towards cotton, and it has now been proved that the finest quality of Sea Island cotton can be grown in almost every island. Last year 2,000 bales were shipped to this country, and it is expected that by the end of the present season the shipments will reach 5,000 bales. The larger portion of this cotton is of very fine quality, and is selling at 15d. to 18d. per lb. It is not too much to say that the best quality of West Indian Sea Island cotton is now given the preference over that grown in the Florida Sea Islands. If the Association had done nothing else, the success in the West Indies has quite justified its existence and the whole of the money which has been spent. It is estimated that the present crop will be worth at least £100,000, mostly grown on derelict sugar plantations. The Association has made large grants of money and supplied machinery for ginning and baling. The industry is now placed on a commercial basis and negotiations have just been concluded for the transfer of a large part of the Association's machinery to an association of planters. Great credit is due to Sir Daniel Morris, the Hon. F. Watts, Mr. Bovell, and others, for the great interest they have taken in this question, and much of the success is due to their efforts.

COTTON PROSPECTS IN ST. VINCENT.

Mr. W. N. Sands, Agricultural Superintendent in St. Vincent, has forwarded, in continuation of the note published in the *Agricultural News*, Vol. V, p. 278, the following brief report, dated October 1, on the prospects of cotton planting in that island:—

As far as I can judge, the present season's cultivations are far in advance of any previous ones, that is, at the same time of the year, notwithstanding that a much larger acreage has been put in. My preliminary estimate for this season was 1,400 acres. I am now pleased to inform you that this has been exceeded by nearly 200 acres, and I should not be surprised if the returns I am now collecting show a total acreage of over 1,600.

The most backward cultivations are to be seen in the Carib Country, where over 100 acres are growing poorly. The lands in this district have a large amount of volcanic ash, besides which the season has not been a good one in this part of the island.

The usual diseases are to be seen in most cultivations, but no serious damage has been observed.

The cotton worm has been found in several places. So far, the natural enemies have been able to keep it in check. The insect chiefly responsible for its destruction here is the Jack Spaniard (*Polistes* sp.). This is the first time the cotton worm has been noticed in the island. Of course all planters have been advised to keep a sharp look-out, and to have Paris green and lime ready in case of emergency.

Picking will commence in two or three weeks' time on several estates, provided fair weather obtains, and all indications at the present time point to a good crop.

It will probably be necessary to commence ginning early next month.

COTTON GROWING IN GRENADA.

The following appeared in an editorial in the *Grenada Federalist*, of August 30:—

Mr. Anstead, the Agricultural Superintendent, has been going about lecturing on the cultivation of Sea Island cotton. We hope his tour around the island will not be unproductive of good. Experiments in Carriacou by Mr. Whitfield Smith show that Sea Island cotton—even of the badly cleaned specimen reported upon—is worth very much more than the Marie Galante, and that its cultivation would, therefore, be more profitable. At 1s. 2d. per lb. for the cleaned lint, the return per acre will be about £11 13s. 4d., while the seeds would certainly bring something more. Mr. Anstead estimates the cultivation and other expenses at £5 per acre, leaving a net return of presumably £6.



PROPAGATION OF THE DATE PALM.

In a recent issue of the *Agricultural Ledger* (1906—No. 1) Mr. F. Fletcher, M.A., B.Sc., deals with the cultivation of the date palm. The following notes on propagation are extracted from this paper:—

The date palm may be propagated in two ways, viz., (a) by means of seed, and (b) by means of 'offshoots.'

Of these methods the latter is the only rational one for the reasons that, if seeds are sown, about half the seedlings are males, and, of course, yield no fruit, while female seedlings seldom produce fruit of as good quality as the tree from which the seeds were obtained.

Now one male tree will, under cultivation, suffice for the fertilization of about 100 females, so that if 98 per cent. of the male seedlings are not destroyed, about half the area of the plantation is occupied by useless trees. This removal of the superfluous males cannot take place until about six years, at the earliest, after sowing, since at that age flowers are first produced. In consequence, for six years, at least, half the plantation consists of trees from which no revenue can ever be obtained.

The reason why seedling female palms do not produce fruit of the same quality as their female parent is that the latter is in general pollinated (artificially) from a male of an inferior variety, and although, except in the case of maize and a few other plants, cross-fertilization of this kind has no effect on the quality of the resulting fruit, it will, of course, influence the offspring. Probably, therefore, out of 100 seedlings from a good female parent only about six would produce fruit of good quality.

PROPAGATION BY MEANS OF OFFSHOOTS.

This, as was stated above, is the only rational method of propagation, since it is thus only that palms, true both in sex and in quality of fruit to the type of the parent, can be secured. We can by this method plant 100 female trees, on the quality of the fruit of which we can rely, and the one male necessary to fertilize these, without wasting time and land in cultivating superfluous male trees and female trees which later prove to bear fruit of an inferior quality.

The offshoots are suckers borne at the base of the stem of trees between the limiting ages of about six and sixteen years. Trees younger than six years of age and older than sixteen do not, as a rule, bear offshoots. Offshoots cut from a male tree will give rise to male trees, and from female trees, females; in the latter case the fruit will be of the same quality as that of the parent palm.

Offshoots are removed from their parent when from three to six years of age. They then weigh about 6 lb. The operation of removal is performed with an ordinary hatchet by cutting down parallel to the parent stem. The large leaves are then cut away, as in the case of seedlings, leaving only the rootless stump of the offshoot, with its bud protected by leaf-stalks and young leaves.

The offshoots should be planted in rows 25 feet apart with similar intervals between plants in the row. For this purpose holes 3 feet deep and the same distance in diameter are made in the soil; half of the excavated earth is mixed with its own volume of farmyard manure with 4 lb. or 5 lb. of oil-cake and filled in, the offshoot being set in the centre of this hole.

In doing this, it is most important that the bud in the

centre of the leaf-stalks and young leaves should not be choked by being covered with soil. For this reason the offshoot should be planted with the bud 2 or 3 inches above the general level of the ground, and a circular trench, 1 foot in width, be dug round it for purposes of irrigation.

The offshoots should be watered every day for the first month, twice a week for the second month, and thenceforward every month for at least a year.

During the first year after planting out, the offshoots should be protected from November to March by wrapping them closely in straw or matting.

VIRGEN RUBBER OF COLOMBIA.

Mr. Robert Thompson contributes to the *Journal of the Jamaica Agricultural Society* an account of the 'virgen' rubber of Colombia, of which the following is a short summary:—

This rubber tree, which is indigenous to Colombia, is a species of the genus *Sapium*, belonging, as do nearly all the important rubber-yielding trees, to the order *Euphorbiaceae*. It is an important rubber-yielding species, whose area of distribution is confined to a very narrow zone in the interior of the republic.

This tree was discovered about twenty-two years ago, when thousands of trees were cut down, and hundreds of tons of rubber, extracted therefrom, were exported to the United States. One tree then encountered by Mr. Thompson was over 100 feet in height, with a trunk $2\frac{1}{2}$ to 3 feet in diameter; when cut down it yielded over 1 cwt. of dry rubber. At that time the price realized for this rubber averaged about 3s. per lb., only a few pence less than the price then obtained for Para rubber.

Mr. Thompson suggests that this tree might be cultivated in the mountainous districts of Jamaica. The elevation above sea-level, at which it was found growing in a state of nature, 4° from the equator, ranged from 5,000 to 7,000 feet. In the course of a year the plants in a Colombia plantation attained a height of from 6 to 8 and 10 feet. In three years the stems were 5 to 6 inches in diameter. Under the elaborate cultural treatment to which the other species of rubber are now subjected, there can be no doubt that, when 50 to 60 feet high, in less than ten years, not less than 1 lb. of rubber per tree will result, and a few years later double or even treble this quantity per annum.

In certain parts of the temperate climate of the parish of Manchester, with its abundant humidity and its peculiarly constituted soil, the 'virgen' rubber could be cultivated with great success. There are thousands of acres of land obtainable above an elevation of 2,700 feet eminently suited to its cultivation in the parish.

As the 'virgen' rubber is a gigantic tree, care must be taken to plant the trees wide apart. The permanent distance might be 24 feet. In ten or twelve years the trees would cover the ground. Regular crops would result from the trees when eight years old and annually afterwards.

Seeds have been supplied by Mr. Thompson to the U. S. Department of Agriculture for experimental cultivation in the south of Florida.

It may be mentioned that a large quantity of seed of the 'virgen' rubber is being obtained for trial in Jamaica by the Secretary of the Agricultural Society, through whom the Imperial Commissioner of Agriculture is also securing a supply for trial, probably, in St. Lucia and Dominica.

EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming, should be addressed to the Commissioner, Imperial Department of Agriculture, Barbados.

All applications for copies of the 'Agricultural News' should be addressed to the Agents, and not to the Department.

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Agricultural News

VOL. V. SATURDAY, OCTOBER 6, 1906. No. 116.

NOTES AND COMMENTS.

Contents of Present Issue.

The editorial in this issue contains figures relating to the expenses and probable receipts in connexion with the cultivation of bananas.

Interesting notes appear on pp. 306 and 307 in regard to the raising of seedling sugar-canes in Mauritius and Louisiana.

It is proposed to establish a banana industry in Surinam. The terms of a contract entered into between the Government of Dutch Guiana and the United Fruit Company regarding the purchase of bananas will be found on p. 308.

In view of the crippled condition of the Cuban tobacco industry, it is suggested that every effort should be made to extend the tobacco industry in Jamaica.

A brief report on the prospects of the cotton crop in St. Vincent appears on p. 310. Reference is also made to the suggestion that Sea Island cotton might be cultivated in Grenada.

Efforts are being made to test the suitability of the 'virgen' rubber of Colombia in the West Indies. An account of this tree is published on p. 311.

Interest attaches to the results of analyses, published on p. 315, of limes and lemons from Dominica. The composition of the spineless lime is compared with that of the ordinary Dominica lime, while results are also given of analyses of two kinds of lemons grown at the Botanic Station.

Arrowing of Sugar-canes in Louisiana.

It will probably be familiar to readers of the *Agricultural News* that in Louisiana, with its frost-curtained growing season, the sugar-cane had not, until last year, been known to arrow. With the introduction of Demerara seedling canes, however, this has been changed.

In the *Agricultural News*, Vol. V, p. 67, it was mentioned that Demerara seedling No. 74 had arrowed in 1905, indicating that this cane, being an early ripener, had managed to form flowers before the frost checked its growth. But, further, it appears that this cane has also succeeded in maturing seed. As mentioned on p. 307 of this issue, Dr. Blouin, the Assistant Director of the Louisiana Sugar Experiment Station, has, after numerous trials, obtained fertile seed from the sugar-cane. It is hoped that it will now be possible to raise new and improved seedling canes in Louisiana.

Sugar-cane Seedlings in Java.

In 1894, Dr. J. H. Wakker, then Director of the East Java Sugar Experiment Station, found that the Cheribon cane bears infertile pollen at the time when the ovary is normal, and may, therefore, be considered a 'female' cane; while other varieties produced abundant quantities of fertile pollen.

A description of the method of planting by which natural cross-fertilization is obtained will be found in the *Agricultural News* (Vol. I, p. 146).

This method of planting alternate rows of 'male' and 'female' canes has been closely followed in Java, and numerous seedlings have been obtained, which have given encouraging results.

The *Jaarverslag* for 1905 from the Proefstation Oost-Java shows that in 1905 over 16,000 sugar-cane seedlings were raised. The parentage of 7,170 of these was known on both sides, for they were produced by the method above mentioned; 7,460 other cane seedlings were obtained from seed collected from the best seedling varieties, the seed-bearing parent only being known with certainty. In all, therefore, something was known of the pedigree of 14,630 out of the 16,000 young seedling plants. The season was very propitious, and this large production of young cane seedlings appears to be a record and is to be favourably contrasted with the production of 580 young plants in 1904, when the season was not so suitable.

Panama Hat Industry.

The importance of the Panama hat industry to the republic of Ecuador is apparent from the following figures, extracted from the *Consular Report* for the years 1899-1905, showing the value of the exports for the last six years: 1900, £32,748; 1901, £37,956; 1902, £68,010; 1903, £70,107; 1904, £88,670; 1905, £125,512.

It will be seen that in the period under review the exports have increased enormously in value; the quantity has likewise increased. It is stated that the

fashion of wearing Panama hats in Europe has advanced at such gigantic strides as to render the native labour unable to keep pace with the demand.

An interesting account of the manufacture of these hats appeared in the *Agricultural News*, Vol. III, p. 310.

Panama hats are made from the leaves of a palm-like plant, *Carludovica palmata*; the Jamaica jippi-jappa hats from a closely allied plant, *C. jamaicensis*. Several references have been made in the *Agricultural News* to the great possibilities of the jippi-jappa hat industry in Jamaica.

Rubber Planting in the Gold Coast.

It is stated in the *Annual Report* on the Gold Coast for 1905 that there has been an increased demand for seeds and plants of Para rubber (*Hevea brasiliensis*), indicating a wide-spread interest in this product.

During the year, 13,000 plants of this species were raised at the Botanical Gardens at Aburi, and were eagerly bought at the price of 1s. 6d. per dozen. There were also distributed from the gardens 168,000 Para rubber seeds. In a plantation under European supervision at Bonsu, 48,000 seedlings were raised last year and are ready for planting out. Further, 500,000 Para rubber seeds have been ordered from Ceylon for delivery during the present year.

In addition nearly two million seeds of *Funtumia elastica* were distributed.

The Para rubber seedlings, planted at the Botanical Station, Tarkwa, have made good progress and are exceptionally healthy trees; some of them have attained a height of 20 feet and a circumference of 7 inches at 3 feet from the ground.

Vanilla in Seychelles.

References have previously been made in the *Agricultural News* to the unsatisfactory condition of the vanilla industry in Seychelles. The continued collapse of this product is again referred to in the *Annual Report* on the colony for 1905.

'Vanilla may have a future; in no place are the conditions of nature more favourable than in Seychelles; but, for the present, it is of little value, and the crop of 1906 is so small that it cannot be expected to exceed 44,000 lb.'

The vanilla industry, which has long been at the head of the products of Seychelles, has now been displaced by the cocoa-nut products. During the last three years the vanilla crops have shown a gradual falling off, due to the drought in 1904, which destroyed one-third of the vines, and reduced the vitality of the remainder. This led to the reduction of the 1905 crop. Another drought in 1905 led to an almost complete failure of the flowering season for the crop of 1906.

It is, however, reported that there was, during 1905, a resolute effort on all sides to improve cocoa-nut cultivation, and to develop new industries, especially rubber cultivation, the desiccation of bananas, and the exploitation of phosphates.

School Children and Cotton Picking.

In his Annual Report on primary education in St. Vincent, the Inspector of Schools makes an interesting suggestion with regard to the employment of school children for picking cotton.

Mr. Harbin refers to the objections made by grown-up persons to picking cotton, who maintain that, owing to the low growth of Sea Island cotton, this occupation is better suited to children. He points out that the scarcity of labour at the cotton-picking season is made all the more serious by these objections, and that, in consequence, much cotton was lost last season from this cause. Considering the proud position obtained by St. Vincent among the cotton-growing islands of the West Indies, every effort should be made to assist the industry.

Mr. Harbin therefore suggests to the Board of Education that the holiday arrangements should be so amended as to admit of three weeks' vacation at Christmas (which is the cotton-picking season), with a view to allowing planters to secure the services of the children in reaping their crop.

It may be of interest to mention that a similar arrangement is made in some of the rural districts of England, to enable the children to participate in certain agricultural operations, such as potato picking.

The Inspector mentions that at one of the schools he visited the teacher had prepared a large quantity of loose and dirty cotton, which the pupils were required to separate.

Agricultural Industries in Fiji.

The report of the Superintendent of Agriculture for 1905 on agriculture in Fiji contains, in addition to a record of exports since 1875, interesting references to the crops of the colony.

At the present time the principal exports are sugar, copra, and fruit. Out of a total export value of £702,362 for the year 1905, the value of the exports of sugar (58,487 tons) was £539,594, or about 77 per cent. Sugar-cane is grown by three large companies on their own estates, by European planters on leased estates, by coolies, and by natives.

Next in the list of exports comes copra, the output last year being 10,200 tons, of the value of £125,891. The cultivation of cocoa-nuts appears to be largely on the increase. Copra is dried by both artificial and natural methods. The yield per acre varies much; $\frac{1}{4}$ ton of copra is considered an average yield, and 6,000 nuts are calculated to yield 1 ton of copra.

Fruit was exported in 1905 to the value of £28,995. This is mainly bananas, of which 147,000 bunches were exported, chiefly to New Zealand.

Formerly, cotton, coffee, pea-nuts, tobacco, and other crops were grown on a fairly large scale. Among new crops whose cultivation is being taken up, mention may be made of cacao and rubber. The actual cultivation of the former has been carried on only during the last four or five years. It is likely that the cultivation of rubber may be taken up. Para rubber plants have been obtained from Ceylon.



INSECT NOTES.

Caterpillars on Sweet Potatos.

During his recent visit to St. Kitt's, Mr. H. A. Ballou, Entomologist on the staff of the Imperial Department of Agriculture, visited a field of sweet potatoes at Lodge estate that had been attacked by large caterpillars a short time before.

The attack had first been noticed on the lower or downhill side of the field which was several acres in extent, and the caterpillars began quickly working their way across the field, entirely stripping the vines of leaves, and making rapid progress. The potatoes belonged to certain peasants, who would not undertake to carry out any recommendations as to remedial measures, and were, at first, unwilling that any poison should be applied to the potato leaves. Mr. F. R. Shepherd, Agricultural Superintendent, however, arranged for a trial of Paris green, and a strip covering six rows across the field was treated to a liberal dusting of Paris green and lime at the rate of 1 to 6, in precisely the same way that cotton is dusted for the control of the cotton worm. None of the caterpillars, so far as could be seen, crossed this strip, enormous numbers being found dead on the ground among the vines to which the poison had been applied.

At the time of his visit Mr. Ballou found the lower side of the field putting out new leaves to a certain extent, but the recovery had been very slight and the difference between the two portions of the field, that which had been attacked and that which had not, was very marked.

This case is a very strong one in illustration of the beneficial results of the prompt use of Paris green, which was also shown in dealing with caterpillars on cassava in St. Lucia, as mentioned in the *Agricultural News*, Vol. V, p. 298.

The caterpillar attacking sweet potatoes in St. Kitt's was probably *Protoparce cingulatus*, but as the larvae and moths were not found, the identification depended on the appearance of the pupa.

Food Plants of Cotton Stainers.

In the paper on cotton stainers which appeared in the *West Indian Bulletin* (Vol. VII, pp. 64-85), and was reviewed in the *Agricultural News* (Vol. V, p. 218), a list of the food plants of these insects was given. This list includes all the plants then known to be attacked by these insects. Cotton stainers (*Dysdercus andreae*) have recently been found feeding upon a wild malvaceous plant growing on the mountains in Nevis, the name of which has not yet been determined.

It is greatly desired to get information as to any additional food plants of these insects, and any notes which might be submitted by readers of the *Agricultural News* would be much appreciated.

Specimens of leaves and flowers of such plants, as well as of insects, might be forwarded through the local officers of the Imperial Department of Agriculture.

Lady-birds.

A correspondent in Barbados has sent to the office of the Imperial Department of Agriculture a number of larvae and pupae of the common red lady-bird (*Cycloneda sanguinea*), with the statement that they are abundant on young cotton and a query as to whether these insects are likely to do the cotton harm.

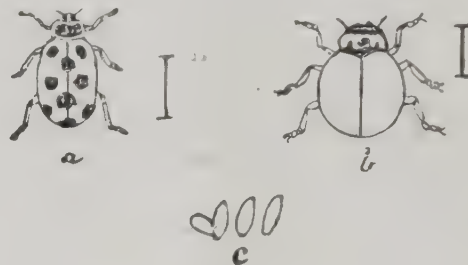


FIG. 19. LADY-BIRDS.

a., Spotted lady-bird (*Megilla maculata*); b., Red lady-bird (*Cycloneda sanguinea*); c., Eggs of lady-bird. All enlarged. It is probable that more careful observation would have disclosed the cotton aphid in considerable numbers on this young cotton, and the lady-birds would then have been seen to be feeding on the aphid.

The lady-bird beetles commonly found in the cotton fields have been frequently described in the *Agricultural News*, and in Vol. IV, p. 298, illustrations were given which show the appearance of the adult beetle and the larva. These

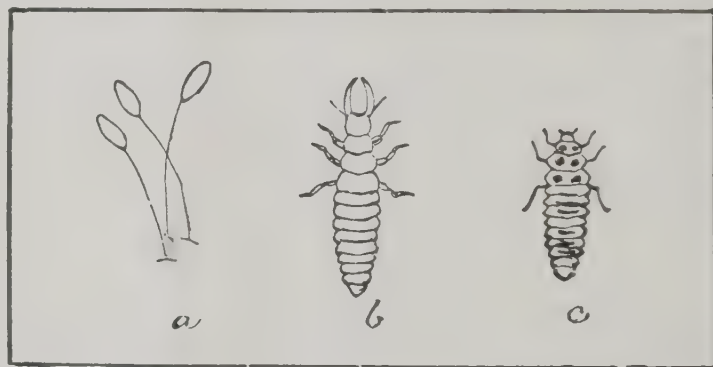


FIG. 20. EGGS AND LARVAE.

a., Eggs, and b., larva, of lace-wing fly; c., larva of lady-bird. All enlarged.

figures are again inserted. Fig. 19 shows two forms of lady-bird commonly found in cotton fields. The larva of a lady-bird is shown in fig. 20, c. The lace-wing fly, whose eggs and larva are illustrated in fig. 20, is also a beneficial insect.

Fig. 21 shows the cotton aphid upon which the lady-birds and the lace-wing fly feed.

The aphid does not very often become destructive; it generally attacks young cotton, but cotton which is healthy and growing rapidly will generally out-grow the aphid attack. It will usually be found on the very young shoots and tender leaves, large numbers of them being closely packed together. This same aphid attacks several other plants, and from these cotton may become infested.

It is desirable that all who are engaged in cotton cultivation should become familiar with the beneficial insects, as well as with the pests, in order that the former may be recognized as friends of the planter and that no apprehension may be felt when they are found in the cotton fields.



FIG. 21. COTTON APHIS.

Much enlarged. Natural size indicated by hair-line.

LEMONS IN DOMINICA.

In view of the efforts that are being made in Dominica to start a lemon industry, it may be of interest to publish the following information extracted from the Annual Report on the Botanic Station. It contains interesting results in reference to the chemical composition of lemons and limes:—

Much interest has lately been shown in the lemons grown at the Botanic Station. Two kinds, the Villa Franca and an Italian lemon, are under cultivation, both being budded on sour orange stocks. The fruits are large, smooth-skinned, and juicy. The London report on them was not altogether favourable; among other things they were described as being sweet lemons. The juice tested by the Hon. Dr. Watts, C.M.G., Government Chemist and Superintendent of Agriculture for the Leeward Islands, showed a greater acidity than that of limes grown in the wet districts of Dominica.

Some hundreds of plants have been budded by request, and it is possible that a small experimental cultivation may be started. If carried on in conjunction with lime cultivation, little financial loss, if any, can result, for, if it is not possible to ship the fruits, they can always be crushed in the mill and the juice concentrated along with the lime juice.

The Hon. Dr. Watts, C.M.G., has tested the juice of two varieties of limes and two varieties of lemons grown at the station. The results are given below:—

LIMES.

	A. Spineless.	B. Ordinary.
Average weight of fruit ...	34.1 grams.	61.9 grams.
Percentage of juice ...	51.3 per cent.	50.8 per cent.
Sp. Gravity $\frac{30^\circ}{16.16}$...	1.0410	1.0390
Total solids, grams per 100 c.c.	11.70	11.15
Citric acid " " " "	9.82	8.87
" " oz. per gallon ...	15.71	14.18
Purity (i.e., ratio of acid to total solids) ...	83.9	79.5

Dr. Watts adds: 'From this it will be observed that the spineless lime is very much smaller than the ordinary lime, but its juice is richer and purer. The juice of the ordinary lime now examined is, however, somewhat low in purity. The point now to be ascertained is whether the spineless lime will bear such a quantity of fruit as to compensate for the smallness in size.'

LEMONS.

	Italian.	Villa Franca.
Apparent acid (from sp. gr.) ...	1.0286	1.0334
13.28 oz. per gal.	15.39	
Real acid ...	11.17	11.37
Co-efficient of purity ...	84.1	73.8

NOTES ON PRUNING COFFEE.

The *Journal of the Jamaica Agricultural Society*, for September, has the following article, by Mr. W. Cradwick, on pruning 'long-top' coffee:—

There is great diversity of opinion as to the advisability of growing 'long-top' coffee under any circumstances, some authorities affirming that with some soils and situations 'long-top' is the most profitable form of cultivation, while

others affirm that it is inferior to 'short-top' both in yield and quality.

It is a fact that all the coffee in Costa Rica is grown on the 'long-top' method; and that the yield there per acre is very high; that the quality is also high is demonstrated by the market reports.

It is a fact that there are several thousands of acres of coffee in Jamaica, which, if properly pruned on the 'long-top' method, would yield much more and better coffee than they do at present.

Unfortunately, it would appear that the majority of cultivators who grow 'long-top' coffee do not prune at all, except perhaps in the rudest fashion. Pruning is usually understood to mean keeping the trees low, or short top. Hundreds of times, I suppose, I have been told when speaking of pruning that 'you cannot keep the trees low on the land or they will die.'

The principles of pruning coffee, whether by the long- or short-top method, are exactly the same. You must grow each year a fresh supply of wood, to supply the trees with young and vigorous wood to bear the future crops. You must each year cut off the old worn-out wood, which, if left on the tree for the following year, will not bear, or, if it does, will be worse than useless, by bearing light coffee, which will spoil the quality of the coffee borne by the good, vigorous wood. It is very easy to see which wood bears good coffee and which bears bad. Pick a few berries from old wood and a few from young wood, cut them open and see what is inside, and you will be taught the lesson at once.

Then remember that, by leaving on the old wood, you have prevented the young wood from bearing as much as it would have done, and you have also hindered the growth of still younger wood, which should give a crop next year.

All wood which bends over should be cut off, cutting off down to where young shoots are growing. Follow this up by selecting two of the biggest and strongest young shoots, and pulling off all the others; you will then get two, big, strong shoots, which will bear plenty of good, heavy coffee. Every year grow two more young shoots, and every year you will have a crop of good coffee, instead of a very big crop of poor coffee one year and none the next.

This is the best year I have seen for some years for heavy pruning, as the continued rains have made the trees grow and not bear. All useless wood can be cut out and you will still have plenty of good wood for next year's crops.

Do not be afraid to thin out the trees. You must have noticed that the trees on the outside of the coffee walks bear the best, while in the middle they bear very little. The reason is that the trees are too thick; the inside ones get no light nor air like the outside ones, and so do not bear.

MINOR INDUSTRIES IN BRITISH GUIANA.

At the half-yearly meeting of the British Guiana Bank, held on September 18, the Managing Director made the following reference to the success of minor industries:—

There are indications of a considerable increase in what may be termed the minor industries of the colony, of which rice takes first place. The rice crop about to be reaped will be the largest on record, and as prices are favourable to the growers, the result to them should be most satisfactory. The value of the crop is estimated at over \$1,000,000.

The balata business is doing well, and attention is now being paid to the planting of rubber in various parts of the colony. This industry should in a few years' time prove of great value.



GLEANINGS.

According to the *Cotton Trade Journal*, the exports of Sea Island cotton from San Juan, Porto Rico, for the year ended June 30 last, amounted to 976 bales (297,080 lb.), of the value of \$95,215.

The *Colonizer* says, in regard to the proposal to start a lemon industry in Dominica: 'if they could be shipped so as to arrive here in the summer, when the market is understocked, they should find a good opening.'

Mr. William Gray, of Edinburgh University, has been appointed Normal and Agricultural Master in British Guiana in succession to Mr. E. G. Chamberlaine. (*Demerara Argosy*, September 19, 1906.)

The American Breeders' Association will hold a meeting at Columbus, Ohio, from January 15 to 18, 1907. At most of the sessions there will be two sections, for animal breeders and plant breeders, respectively.

It has been decided by the Government of Trinidad to distribute 500 copies of this Department's pamphlet (No. 41) 'Tobago, Hints to Settlers,' among headmasters of public schools in England.

A special meeting of the St. Lucia Agricultural Society was held on Monday, October 1, at which Mr. H. A. Ballou, M.Sc., Entomologist on the staff of the Imperial Department of Agriculture, gave an address relating to insect pests.

The Agricultural Superintendent at St. Vincent reports that arrangements have been made to carry out a scheme of seed selection for cotton on four estates in the island. On each of these estates 100 plants will be selected by Mr. Thornton and Mr. Sands.

It is stated in the Report on Agricultural Investigations in Porto Rico during 1905 that small seedlings of Ceara rubber (*Manihot Glaziovii*) in the station nursery have been attacked by the cassava bud maggot, which, however, does not damage larger trees.

The boys of the Dominica Agricultural School devote much of their leisure time to the budding of oranges. Some of them have as many as 100 stocks in their gardens at the present time, all of which will be readily sold at 6d. each as soon as they have been budded.

The bark of the West Indian and South American mangrove tree (*Rhizophora Mangle*), which has for years been in use locally as a wound remedy and febrifuge, has, by the long-continued experiments of M. Duque and A. Moreno, been shown to be a specific for leprosy. (*Merck's 'Annual Reports.'*)

With a view to obtaining authentic information as to the probable results to be obtained from *Castilloa* rubber trees in Jamaica, a planter in the parish of Portland has offered to allow the Agricultural Society to carry out tapping experiments on trees on his estate.

During the period June 5 to August 13, 1906, the Agricultural Department at Barbados shipped to the United Kingdom 103 bunches of bananas, all of which, with two exceptions, arrived in good condition. The prices paid to planters have varied from 63c. to 76c. per bunch.

Apparently but little interest is being taken in cotton cultivation in Jamaica. According to Mr. John Barclay, the Secretary of the Jamaica Agricultural Society, there will probably be about 250 acres planted in Vere, 50 acres at Inverness, and of small cultivators about 50 acres. He estimates that the area under cotton in Jamaica will not exceed 300 acres.

The Agricultural Instructor for Nevis reports that a fairly general rainfall of about 8 inches accompanied the cyclonic disturbance of August 31-September 1. This has relieved the great tension that existed among sugar and cotton planters. Some of the early-planted cotton was badly lodged by the heavy wind, but, on the whole, the damage was not great.

His Honour the Acting Administrator of St. Kitt's-Nevis has appointed the Hon. C. A. Shand, Dr. J. N. Rat, and Messrs. M. Evelyn, Malone, and Greaves to be a committee to receive and consider the particulars submitted by the several cotton growers in connexion with the award of the gold medal offered by Sir Alfred Jones, K.C.M.G., for the best cotton grown in the island of Nevis.

The shipments of sisal hemp from Turks Island are all made to New York, and vary yearly in quantity. For 1905 the weight was 398,284 lb., valued at \$28,340. All the sponges exported in 1905 also went to New York and were valued at \$10,814. Turtle shells were exported to the extent of \$2,595. The salt industry has been a disastrous one for past two seasons. (*U. S. Monthly Consular Reports.*)

According to the *U. S. Monthly Consular Reports*, considerable interest is being taken in the discovery of the occurrence in Formosa of a new rubber vine belonging to the order *Apocynaceae*, which has been designated *Ecdysanthera utilis*. It grows profusely in the valleys in the northern and middle parts of the island. It is believed that the discovery will lead to an industry of considerable dimensions.

WEST INDIAN AGRICULTURAL CONFERENCE.

The Imperial Commissioner of Agriculture for the West Indies is making a further effort to hold the next West Indian Agricultural Conference in Jamaica. With that view the Commissioner is in communication with the Governor of Jamaica, and it is hoped that it may be possible to arrange for steamer services so that the conference may meet in Jamaica in the second week of January next.

PHASEOLUS MUNGO FOR GREEN MANURING.

The officer-in-charge of the Dominica Agricultural School has forwarded the following information in regard to comparative trials of three varieties of *Phaseolus Mungo*, undertaken to test their suitability for green manuring:—

Seed of each variety was sown in adjoining beds. They germinated and grew well, the woolly pyrol being much the strongest of the three varieties. In six weeks all three varieties flowered simultaneously.

The table below shows the differences in the habits of growth of these three varieties:—

Name.	Habit.	Height or length.	Lateral spread.
1. Woolly pyrol	Trailing.	4½ feet	3½ feet.
2 Newman bean	Dwarf & erect.	2½ „	2 „
3. Grecian bean	Dwarf & erect.	1½ „	1½ „

As will be seen from the above, No. 1 is much more suitable for green manuring than Nos. 2 and 3.

CANDLE-NUT OIL.

The *Agricultural Gazette* of New South Wales, for August, has the following account of the composition of candle-nuts and the uses of the oil. This tree is not uncommon in the West Indies:—

The candle-nut is the fruit of *Aleurites triloba*, a tree which grows principally in Java, Sumatra, the Moluccas Island, and in the South Pacific Islands. The nuts are interesting on account of the large proportion of oil which they contain, and the product is coming into demand. The nut has received its name from the fact that the kernel burns like a candle when a light is applied to it; and the natives of some of the South Pacific Islands utilize them threaded on reeds for this purpose. Several such candles, wrapped together in a pandanus leaf, form a torch.

The following gives the composition of the kernels obtained from one of the Pacific Islands:—

ANALYSIS OF CANDLE-NUT (KERNEL).

Moisture	8.23
Albuminoids	8.04
Oil	59.93
Fibre	2.62
Ash	3.56
Carbohydrates (by difference) including pectous bodies	17.62
	100.00
Nutrient value	116½
Albuminoid ratio	1 to 19.

Of the 60 per cent. of oil contained in the nuts, quite 55 per cent. should be readily extractable commercially. This proportion is extremely high when compared with the amount derivable from other oil-bearing nuts and seeds, and is equal to poppy seed, which also contains about 60 per cent. of oil. Linseed and hempseed contain from 30 to 35 per cent. of oil, and castor-oil seeds 40 to 45 per cent.

The oil expressed from the candle-nut is known under several names, viz., Bankul oil, Eboc oil, also artists' oil. It is a drying oil, and is used in the arts for the same purposes as linseed oil, and also for burning. Its drying power is quite as high as that of linseed oil, and it may be used for all purposes for which the latter is used, namely, in the manufacture of oil-colours, lacquers, and varnishes, and for soap-making. It is used medicinally as a plaster, and as an article of diet, as olive oil is used. The nuts are themselves edible, and, as will be seen from the analysis, have a high nutritive value. The cake from which the oil has been expressed can be used as a cattle food and as a manure, in the same way that linseed and other cakes are used. There is a fair demand for it in England and on the Continent for the purposes above-mentioned, and there would probably be a good local demand if the supply could be depended upon.

The market value may be estimated at about £18 to £20 per ton.

INTERNATIONAL CONFERENCE ON HARDINESS AND ACCLIMATIZATION.

The following copy of a letter addressed by the Secretary of the Horticultural Society of New York to the Imperial Commissioner of Agriculture is published for general information:—

The Horticultural Society of New York proposes to hold in the early fall of 1907, an International Conference on Hardiness and Acclimatization, if there is sufficient general interest evinced to warrant organizing such a gathering.

I am instructed by the President and Council to ascertain whether you are sufficiently interested to accord your support to such a conference and perhaps take part in the deliberations.

I need hardly remind you that the questions proposed are of supreme importance to horticulturists, and there is very little, if any, codified matter available. The proceedings of the conference would form the substance of a volume of Memoirs of this Society, and would be a companion to the Proceedings of the International Conference on Plant Breeding held in 1902.

Any assistance that you can give, suggesting lines for discussion, together with the names of those whom you think might be interested and whom I could approach, would be greatly appreciated.

BASELLA ALBA.

Mr. J. Jones, Curator of the Botanic Station in Dominica, has forwarded the following note on a useful spinach plant (*Basella alba*):—

Probably the best spinach for cultivation in the West Indies is *Basella alba*, an Indian plant. It has been grown in Dominica for several years, and is highly appreciated by those who grow it, but it is not nearly so widely known in the island as it deserves to be. It can be grown in the shade or in the open. The young succulent shoots are generally used for cooking, but the leaves alone will make an excellent spinach. The plant is a rapid grower, and one small bed will yield a regular supply of spinach for the greater part of the year. It is greatly superior to the species of *Amaranthus* generally used in the West Indies for spinach. *Basella alba* produces seed abundantly during the early months of the year.



GRENADA : ANNUAL REPORTS ON THE BOTANIC STATION AND AGRICULTURAL INSTRUCTION, 1905-6.

Botanic Station.—Mr. Anstead took up his duties as Agricultural Superintendent on June 6, 1905. In his report he deals with the usual routine work of the Botanic Station and also the general efforts that have been made during the year for the furtherance of agricultural progress in the colony.

The receipts from the sale of plants, seeds, and produce amounted to £72 5s. 3d., showing an increase of £14 7s. 5d. over last year's receipts from the same sources.

The rainfall during the year at the Richmond Hill station, immediately above the Botanic Station, was 73.98 inches, which figure is nearly 5 inches below the average for the past fifteen years. A very severe drought was experienced during the last months of the period under review.

The number of economic plants sold from the nursery during the year was 4,532; this is an increase of 50 per cent. on last year's distribution. In addition, 7,000 plants of sugar-cane seedling D. 95 and a large number of seeds were distributed.

The appearance of the garden has been improved by the addition of a large number of interesting species. Some progress has been made in ridding the garden of 'black blight,' with which many of the trees are infested. Unfortunately, trees to windward of the gardens act as a permanent source of re-infection.

An interesting feature of the agricultural efforts in Grenada is the starting of a number of experiments with cacao on estates. These experiments are on a larger scale than the Department experiment plots; the estate bears all expenses, the Department supplying scientific advice. Five such stations have been established, and a scheme of manurial experiments arranged for each.

Agricultural Instruction.—Mr. George F. Branch took up his duties as Agricultural Instructor on July 22, 1905. Since that time he has been engaged in visiting peasant holdings and estates, in laying out the experiment plots, and in promoting the prize-holding scheme.

Tables are attached to the report which give full particulars as to the conditions existing on the four cacao experiment plots in the country districts, together with a complete account of the manurial and cultural treatment adopted on them.

FIJI: REPORT ON AGRICULTURE FOR THE YEAR 1905. By C. H. Knowles, B.Sc., Superintendent of Agriculture.

Mr. Knowles arrived in Fiji from St. Vincent in January 1905, and during the year was engaged in visiting the chief agricultural centres.

It has been decided to maintain two experiment stations, the objects of which are as follows: to form a permanent collection of economic and ornamental plants, to maintain experimental plots for the trial of new crops, or other crops

under various treatment, to introduce and distribute new plants and new varieties, and for the trial of various methods of treatment of pests and diseases of plants.

In addition to these two stations of the Agricultural Department, experiments are carried out on various estates. These include experiments with Sea Island cotton, manurial experiments with bananas, and trials of bacterial cultures with the Florida velvet bean.

RUBBER IN PORTO RICO.

The following note on observations as to the growth of rubber trees in Porto Rico appears in the Report on Agricultural Investigations in that island during 1905:—

The condition of the rubber trees is very much as in the last report. The Central American rubber trees (*Castilloa elastica*), which have been planted three years, in very rich soil, are now 16 feet high with a spread of 12 feet; while the others planted in the usual heavy clay soil are only 4 to 6 feet high. Trees which were sent to Arecibo and Bayamon have made growth similar to the best of these when on cultivated and fertilized soil. Some of the trees in the station plantation have been fertilized with stable manure, without perceptible change in growth and the result, so far, is negative. The experiments have brought out the following facts which correspond with the experience of the horticulturist in Florida. The *Castilloa* succeeds best when not transplanted or when transplanted very young, so as not to disturb the roots. A tree six to twelve months old is severely stunted by transplanting. The methods of planting in sod and keeping a small circle cleaned around the trees has not proved successful except in soil which would have grown any other tropical tree under the same conditions. *Hevea brasiliensis* has made but slow growth. *Manihot Glaziovii* has made a fairly good growth near San Juan, where a few trees are planted in a yard. It is of course cultivated and properly fertilized.

RUBBER IN THE MALAY STATES.

In the *Annual Report* on the Federated Malay States for 1905 the following reference is made to the extension of rubber cultivation:—

The high price of rubber and the proved suitability of land in those states for its cultivation have led to numerous applications for land, but more particularly in Selangor, where almost all the accessible land between the Klang and the Selangor rivers has been taken up for rubber planting. Large areas of land have been applied for and granted for the purposes of this industry, and most of the large estates have been converted into, or sold to, limited liability companies. Next to the coast districts of Selangor, the Sungei Ujong district of the Negri Sembilan appears to be the locality most in favour with rubber prospectors.

According to Mr. Carruthers, the Director of Agriculture, the area alienated for the planting of Para rubber is some 100,000 acres, of which about 38,000 acres have already been planted. Most of the Para rubber trees of the age of five years or more have been planted 200 to the acre; some estates have as many as 300 to the acre. On the more recent clearings the average is probably 175 to the acre. The number of trees of all ages in the Federated Malay States may perhaps be put at six to seven millions.

The rubber production of 1905 is estimated to have been 300,000 lb.

WEST INDIAN PRODUCTS.

Drugs and Spices in the London Market.

The following report on the London drug and spice market for the month of August has been received from Mr. J. R. Jackson, A.L.S.:—

The month of August is generally acknowledged as the holiday month when London is proverbially empty. Under these conditions, the fluctuations that have occurred during the month are only such as are to be expected.

GINGER.

At the first spice sale, on August 1, no Jamaica was offered, but out of 356 packages of Cochin and Calicut some 200 were sold, medium and small washed Cochin fetching 26s. 6d. A fortnight later, Jamaica was represented by 617 packages, 170 of which sold at from 63s. to 70s. for good middling to fair bright. In the following week, there was no Jamaica offered, and only 20 bags of damaged Cochin, which were disposed of at 22s. to 23s. 6d. At the last sale 335 barrels of Jamaica were offered and 80 sold at the following rates: fair to good washed, 67s. to 68s.; good common, 63s. 6d.; and common, 59s.

NUTMEGS, MACE, AND PIMENTO.

At the beginning of the month the sales of all these spices were steady at usual rates, but on the 15th. 327 packages of West Indian nutmegs were offered and 290 sold at quite normal prices, no change having taken place at the two succeeding auctions.

In regard to mace the same remarks are applicable. Some small sales of West Indian were made at from 1s. 9d. to 2s., and fair at from 1s. 5d. to 1s. 6d. per lb. At the auction on August 1, a moderate business was done in pimento, 3d. per lb. being obtained in a firm market. A fortnight later a slight advance took place, some 2,000 bags being offered and bought in at 3½d. At the end of the month the quotation had fallen to 2¾d. for fair, at which rate a few bags only were disposed of.

ARROWROOT.

At the spice auction on the 1st., some 35 cases of Natal were offered and bought in, but no West Indian. On the 15th., 5 barrels of St. Vincent were offered and disposed of at 1¾d. for fair manufacturing. On the 22nd., 157 barrels of St. Vincent were offered and bought in at 2¼d. to 2¾d., and for fine 3¾d. per lb. At the last sale no St. Vincent was offered, but the offerings of Natal were bought in at 3¼d. per lb.

KOLA NUTS, TAMARINDS, AND CASSIA FISTULA.

Of other West Indian products good bold kola nuts were sold without reserve at the beginning of the month at 3½d. per lb. On the 15th., some 25 barrels were offered, a portion of which, consisting of good fresh Grenada, was disposed of at 10d. per lb. A week later, some sales of good dry Jamaica were made at 4d. per lb. In comparison with these, it may be stated that at the last auction some fair, rather dark, Ceylon halves, in cases, were sold at 3d. per lb. Of tamarinds, at the sale on the 1st., 15s. 6d. per cwt. was paid for fair West Indian and 12s. 6d. for dark. A fortnight later, some 90 packages of tamarinds were offered, and 25 sold; fair Barbados, rather dry, realizing 14s. per cwt. in bond, and good fresh Antigua 13s. Some 45 packages of Cassia Fistula pods were offered at the last sale of the month and 10 sold at 14s. per cwt. for fair West Indian.

SARSAPARILLA.

At the beginning of the month there was a tendency towards higher rates. Two bales of fair bright red native Jamaica found buyers at 1s. per lb. A limited quantity of Jamaica fetched 1s. 6d. to 1s. 8d. No Lima was obtainable. A fortnight later, grey Jamaica sold at an advance of about 2d. per lb. over previous prices; 23 bales of native Jamaica fetched from 8d. to 10d. for common mixed greyish and red sea-damaged; for 1 bale of sound red, 1s. 2d. per lb. was paid. At the end of the month the markets stood thus: for 13 bales of grey Jamaica, out of 21 offered, 1s. 8d. to 1s. 9d. per lb. was realized; for 6 bales of fair, part grease-damaged Lima-Jamaica 1s. 5d. was paid; and for a further 2 bales, 1s. 4d.

ORANGE PEEL AND CHILLIES.

Orange peel, for which there has been a fair demand, has been sold at from 3d. to 3½d. per lb. for thin cut; while for Chillies the current prices have been as follows: Japanese, 18s. 6d. to 22s.; good, 32s. to 32s. 6d.; and fine, 47s.; Zanzibar fair stalky, 17s.; Mombasa were bought in at 25s., and good bright red Nyasaland sold at 37s.

CEDAR FROM GRENADA.

The following note appeared in the *St. George's Chronicle*, of September 15:—

A considerable number of blocks of recently felled red cedar timber are now lying on the wharves of the agents of the Trinidad line of steamers, awaiting shipment by Mr. Samuel Franco to the United States, where there is now a demand for that description of wood. This, we believe, is the first time in a century that such a quantity of red cedar is being exported from Grenada. Formerly, and before the introduction of cheap English, American, and German furniture, the mahogany and cedar trees grown in this island were utilized for the manufacture of furniture by local cabinet-makers, specimens of whose work may still be seen in the houses of old families in the shape of massive and artistically carved bedsteads, sideboards, sofas, etc. The introduction of furniture from abroad has, however, practically killed the cabinet-making industry which once flourished here. So large is Mr. Franco's order for cedar timber that almost every tree of that description which has luxuriated in this town and its environs for the past fifty or sixty years has fallen to the woodman's axe.

DEPARTMENT NEWS.

The Imperial Commissioner of Agriculture gave an address on the Position and Prospects of the West Indian Sea Island Cotton Industry before the Manchester Chamber of Commerce on August 29. He afterwards embarked at Liverpool for Canada in S. S. 'Victoria' on August 31 and arrived at Montreal on September 8. After visiting Ottawa and Quebec and looking after the interests of the West Indies at the Dominion Exhibition at Halifax from September 22 to October 5, Sir Daniel Morris hoped to embark in S. S. 'Oruro' on October 6 and to arrive in the Northern Islands about October 14 next.

Mr. H. A. Ballou, M.Sc., Entomologist on the staff of the Imperial Department of Agriculture, returned to Barbados from St. Lucia in R. M. S. 'Yare' on Tuesday, October 2. Since August 18, Mr. Ballou has been engaged in investigating insect pests in the Northern Islands.

MARKET REPORTS.

London,—September 11, 1906. Messrs. KEARTON, PIPER & Co.; Messrs. E. A. DE PASS & Co. September 7, 'THE WEST INDIA COMMITTEE CIRCULAR,' September 5, 'THE LIVERPOOL COTTON ASSOCIATION WEEKLY CIRCULAR,' September 7, and 'THE PUBLIC LEDGER,' September 8, 1906.

ALOES—Barbados, 15/- to 60/-; Curaçoa, 18/- to 55/- per cwt.
ARROWROOT—St. Vincent, 2d. per lb.
BALATA—Sheet, 1/5 to 2/-; block, 1/5 to 1/5½ per lb.
BEES'-WAX—£7 10s. to £8 2s. 6d. per cwt.
CACAO—Trinidad, 62/- to 68/- per cwt.; Grenada, 55/- to 59/- per cwt.

CARDAMOMS—Mysore, 7½d. to 3/- per lb.

COFFEE—Jamaica, good ordinary, 40/- to 42/- per cwt.

COTTON—St. Thomas, 10½d. to 15d.; Barbados, 13d. to 15d.; St. Kitt's, 12½d. to 15d.; Antigua, 12d. to 15½d.; Nevis, 11d. to 14d.; Anguilla, 13½d.; and Montserrat, 11d. per lb.

FRUIT—

GRAPE FRUIT—15/- to 17/- per box.

BANANAS—Jamaica, 4/6 to 6/- per bunch.

LIMES—6/- to 7/- per box of 200.

ORANGES—12/- to 14/- per box.

PINE-APPLES—St. Michael's, 1/9 to 4/- each.

FUSTIC—£4 to £4 10s. per ton.

GINGER—Jamaica, 59/- to 62/- per cwt.

HONEY—Darkish to fair, 17/6 to 19/-; good to good bright, 20/- to 22/-; fine bright, 26/- per cwt.

ISINGLASS—West Indian lump, 1/9 to 2/3; cake, 1/1 per lb.

KOLA NUTS—4d. to 6d. per lb.

LIME JUICE—Raw, 11d. to 1/2 per gallon; concentrated, £22 10s. to £22 15s. per cask of 108 gallons; hand-pressed, 2/6 to 2/9 per lb. Distilled Oil, 2/6 per lb.

LOGWOOD—£4 to £4 15s.; roots, £3 10s. to £4 per ton.

MACE—Good palish, 1/6 to 1/7; fair pale 1/5; fair red 1/3 to 1/4; broken, 10½d. to 1/1 per lb.

NITRATE OF SODA—Agricultural, £11 15s. per ton.

NUTMEGS—56's, 2/6; 64's, 1/3 to 1/5; 75's, 10½d.; 84's, 9½d.; 94's, 7½d.; 100's, 7d.; 108's, 6½d.; 120's, 6d.; 130's, 5½d.; 145's, 5d. per lb.

PIMENTO—Fair, 2½d. to 3d. per lb.

RUM—Jamaica, 2/2; Demerara, 10d. per proof gallon.

SUGAR—Yellow crystals, 15/- to 15/6 per cwt.; Muscovado, 14/- to 14/6 per cwt.; Molasses, 10/- to 14/- per cwt.

SULPHATE OF AMMONIA—£11 17s. 6d. per ton.

Montreal,—September 14, 1906.—Mr. J. RUSSELL MURRAY.
(In bond quotations, c. & f.)

COCOA-NUTS—Jamaica, \$26.50 to \$28.50; Trinidad, \$25.00 to \$26.00 per M.

COFFEE—Jamaica, medium, 10c. to 11c. per lb.

GINGER—Jamaica, unbleached, 16c. per lb.

MOLASCUIT—Demerara, \$1.00 per 100 lb.

MOLASSES—Barbados, 26c. to 27c.; Antigua, 21c. per Imperial gallon.

NUTMEGS—Grenada, 110's, 18c. per lb.

PIMENTO—Jamaica, 6½c. per lb.

SUGAR—Grey crystals, 96°, \$2.50 per 100 lb.

—Muscovados, 89°, \$2.00 per 100 lb.

—Molasses, 89°, \$1.75 per 100 lb.

New York,—September 21, 1906.—Messrs. GILLESPIE Bros. & Co.

CACAO—Caracas, 14c. to 16c.; Grenada, 15c. to 15½c.; Trinidad, 14c. to 15c.; Jamaica, 13c. to 14c. per lb.

COCOA-NUTS—Jamaica, \$30.00 to \$32.00; Trinidad, \$30.00 per M.

COFFEE—Jamaica ordinary, 8¼c. to 8½c.; good ordinary, 8½c. to 8¾c. per lb.

GINGER—Dark scraggy root, 9c. to 10½c.; white to bright bold, 10¾c. to 12½c. per lb.

GOAT SKINS—Jamaica, Antigua, and Barbados, 59c.;

St. Kitt's, St. Thomas, and St. Croix, 49c. to 51c. per lb.

GRAPE FRUIT—Jamaica, \$4.25 to \$4.75 per box.

LIMES—No quotations.

MACE—30c. to 35c. per lb.

NUTMEGS—West Indian, 75's to 80's, 19c. to 20c.; 90's to 100's, 14½c. to 15c.; 110's, 12½c. to 13c.; 130's, 10c. to 11½c. per lb.

ORANGES—Jamaica, \$2.00 to \$2.50 per box.

PIMENTO—5½c. per lb.

SUGAR—Centrifugals, 96°, 4½c.; Muscovados, 89°, 3½c. Molasses, 89°, 3½c. per lb., duty paid.

INTER-COLONIAL MARKETS.

Barbados,—September 22, 1906.—Messrs. T. S. GARRAWAY & Co., and Messrs. JAMES A. LYNCH & Co., September 25, 1906.

ARROWROOT—St. Vincent, \$4.10 to \$4.50 per 100 lb.

CACAO—\$12.00 to \$12.50 per 100 lb.

COCOA-NUTS—\$11.00 per M. for husked nuts.

COFFEE—\$10.50 to \$11.00 per 100 lb.

HAY—85c. to 90c. per 100 lb.

MANURES—Nitrate of soda, \$60.00; Ohlendorff's dissolved guano, \$55.00; Cotton manure, \$42.00; Cacao manure, \$42.00 to \$45.00; Sulphate of ammonia, \$75.00; Sulphate of potash, \$67.00 per ton.

ONIONS—Madeira, \$1.55 to \$1.80 per 100 lb.

POTATOS, ENGLISH—\$2.28 per 160 lb.; Nova Scotia, \$3.00; Bermuda, \$4.25 per 160 lb.

RICE—Ballam, \$6.50 per bag (190 lb.); Patna, \$3.40 to \$3.50; Rangoon, \$2.75 per 100 lb.

SUGAR—No quotations.

British Guiana,—September 29, 1906.—Messrs. WIETING & RICHTER.

ARROWROOT—St. Vincent, no quotations.

BALATA—Venezuela block, 25c.; Demerara sheet, 38c. per lb.

CACAO—Native, 12c. to 13c. per lb.

CASSAVA STARCH—\$4.00 to \$5.00 per barrel.

COCOA-NUTS—\$10.00 to \$12.00 per M.

COFFEE—14½c. per lb.

DHAL—\$4.70 per bag of 168 lb.

EDDOS—84c. to \$1.20 per barrel.

MOLASSES—16½c. per gallon.

ONIONS—Madeira, 2½c. per lb.

PLANTAINS—16c. to 36c. per bunch.

POTATOS, ENGLISH—Nova Scotia, \$2.25 to \$2.75 per barrel.

POTATOS, SWEET—Creole, \$1.44; Barbados, \$1.80 per bag.

RICE—Ballam, \$6.00 to \$6.25 per 177 lb.; Creole, \$5.35 per bag (ex store).

SPLIT PEAS—\$6.00 per bag (210 lb.).

TANNIAS—\$1.56 per barrel.

YAMS—White, \$2.40; Buck, \$3.36 per bag.

SUGAR—Dark crystals, \$2.40 to \$2.45; Yellow, \$2.70 to \$2.75; White, \$3.65 to \$3.75; Molasses, \$1.50 to \$1.70 per 100 lb. (retail).

TIMBER—Greenheart, 32c. to 55c. per cubic foot.

WALLABA SHINGLES—\$3.00, \$3.75, and \$5.25 per M.

Trinidad,—September 29, 1906.—Messrs. GORDON, GRANT & Co.

CACAO—Ordinary to good red, \$15.25 to \$15.50; estates, \$16.25 per fanega (110 lb.); Venezuelian, \$15.50 to \$16.00 per fanega.

COCOA-NUTS—\$21.00 per M., f.o.b.

COCOA-NUT OIL—73c. per Imperial gallon (cask included).

COPRA—\$3.75 to \$3.85 per 100 lb.

DHAL—\$4.65 to \$4.75 per 2-bushel bag.

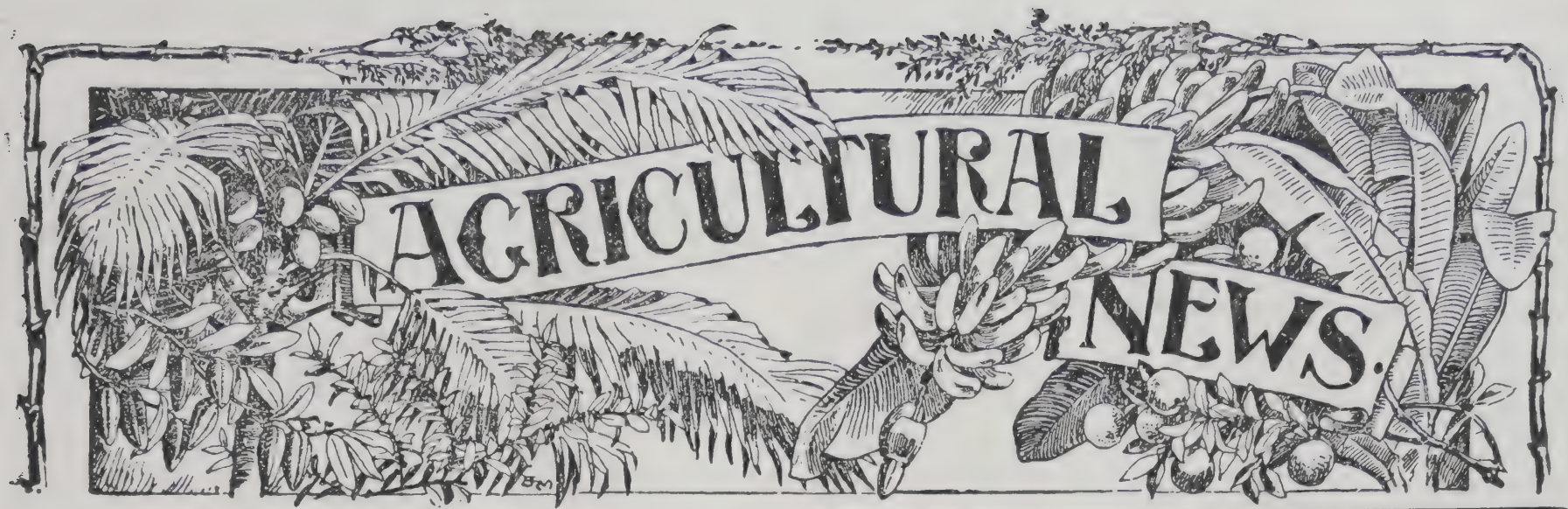
ONIONS—\$1.80 to \$1.90 per 100 lb. (retail).

POTATOS, ENGLISH—\$1.35 to \$1.40 per 100 lb.

RICE—Yellow, \$6.25 to \$6.50; White, \$6.00 to \$6.25 per bag.

SPLIT PEAS—\$5.70 to \$5.80 per bag.

SUGAR—Grocery, \$2.25 to \$3.00 per 100 lb.



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Fungus Diseases of Plants.

THE fact that great losses have been experienced through fungus diseases of plants has repeatedly been pointed out in the *Agricultural News*, and this should emphasize the importance of measures to prevent the spread of fungus parasites.

Though the existence of fungus diseases in plants has been known from earliest times, attempts to prevent their spread were practically impossible owing to a lack of knowledge of the relationship between host and parasite, but now various methods for the prevention of their occurrence and spread are in common use. It is now known that fungi spread in many different ways, viz., by means of spores, which, owing to their microscopic size, can be blown by the wind for considerable distances; by concentrated masses of mycelium called sclerotia; by a mycelium that travels through the soil; or by means of hibernating mycelium in seeds, tubers, or cuttings.

The methods at our disposal for combating fungus diseases may be grouped under five heads: (1) Killing the parasite without injuring the host-plant; (2) destruction of plant tissues that contain the resting forms of the fungus; (3) avoiding conditions that are known to be favourable to the spread of the disease; (4) raising disease-resitant varieties; (5) avoiding the importation of new plants from localities that possess diseased areas.

(1) The measures to be adopted in order to destroy parasites without injury to the host-plants are regulated by the life-histories of the fungi that cause the diseases. The disinfection of cotton seed with corrosive sublimate has been repeatedly recommended by the Imperial Department of Agriculture, because investigations have shown that anthracnose spores, which might cause loss amongst cotton in the seedling stage, can in this way be effectively destroyed without damaging the germinating power of the seed. The

destruction of the vegetative portion of the parasite or its reproductive spores, whilst in active growth on the host-plant, can be accomplished by the use of various fungicides. These should be used rather as preventives, and are more successful in combating diseases of leaves and fruit than where deep-seated mycelia have to be dealt with.

(2) The destruction of plant tissues containing resting forms of the fungus must not be overlooked. The ideal method, of course, is to burn all such plant remains; but often this is impossible. There are many plants or portions of plants that contain too much water to burn satisfactorily, and these should be buried with lime. The addition of lime hastens decay and prevents local souring of the soil by the addition of large quantities of decaying matter. The burial of all diseased cacao pods, as well as the husks or shells of healthy pods, left after the beans have been extracted, has resulted in the prevention of the spread of the 'pod diseases' of cacao, and also in the enrichment of the soil.

(3) In many cases it is impossible to avoid conditions which are favourable to infection. In damp, warm weather, spores of fungi are less readily distributed by the wind, but they stand a much better chance of germination. Unfavourable conditions of the soil, also, are often the cause of the rapid spread of root diseases, and careful attention to drainage, cultivation, etc., would successfully check their spread, and at the same time give a more vigorous crop, capable of resisting further attacks of disease.

The isolation of affected areas by means of a trench, so as to prevent the spread of the mycelium through the soil to still healthy plants, should confine it to certain areas, which should then be cleared and treated with large quantities of lime in order to kill out some, if not all, of the 'roots' of the fungus.

The fungus of a root disease may often be starved out by the rotation of crops. In the case of temporary crops, like the sugar-cane and cotton, this can easily be carried out; but in the case of such permanent crops as cacao it is impossible. However, when a cacao or similar tree has died from a root disease, the diseased roots should be destroyed, and the ground allowed to remain some time before another tree is planted.

A large number of fungi can bring about infection of their host-plants only through breaks or wounds. As long as the protective layers are sound, the plant remains free from the attacks of such wound parasites, and, therefore, pruning and fruit-picking should be

carefully done. The canker of cacao is caused by a wound parasite, and if careful attention were given to pruning, etc., as well as to the tarring of all wounds, conditions likely to bring about infection would be avoided. The treatment of cane cuttings, frequently recommended by the Imperial Department of Agriculture, should be continued, as investigations show that this is a means of preventing, to a certain extent, infection by the mycelium of the root fungus.

(4) The raising of disease-resisting varieties is becoming recognized as a matter of considerable importance. Some varieties are more or less free from disease, while others, cultivated under the same conditions, are especially susceptible to it. The varieties that are least susceptible to disease should be selected for future cultivation, if they possess the other desirable qualities. The wilt disease of cotton and cowpea has successfully been overcome by selecting immune varieties, while many seedling sugar-canes are capable of withstanding certain fungoid diseases much better than the older varieties.

(5) The importation of plants from infected areas has often resulted in the introduction of new fungoid diseases, and many countries have formulated laws to prevent such occurrence, as has already been done in the case of insect pests in many West India Islands. It is hoped that the different Governments will also prohibit the importation of seeds or plants from localities affected with fungus diseases, or allow their importation only after disinfection at the port of entry.

SUGAR INDUSTRY IN FORMOSA.

The *Consular Report* on the trade of Tainan, South Formosa, for 1905, has the following reference to the progress of the sugar industry:—

It is expected that, as the native Chinese become more experienced, they will adopt more modern machinery, and that eventually there will be a regular central factory system. Owing to the difficulties caused by inexperience in working new machinery, the 1905-6 crop has not been worked off as quickly as usual, and there is consequently a lesser area of cane planted for the coming season, 1906-7, than in 1905. This is partly due to the low prices received during the 1905-6 season. But although the area planted is less, it is expected that the new crop for 1906-7 will not be much smaller than that for the previous season, on account of the large increase in 'rose bamboo' sugar-cane planted. This cane yields about three times the quantity, area for area, produced by the old-style bamboo canes, which are rapidly being abandoned, and it is anticipated that, within the next few years, there will be no more old-style bamboo canes left, except in places which are not suitable for the 'rose bamboo.' It is calculated that the output per acre from the old-style bamboo canes is from 10 to 15 tons per acre, and from the 'rose bamboo' about 30 tons per acre.

SUGAR INDUSTRY.

Sugar Production in Java.

The following correspondence relating to the production of sugar in Java is published for general information in continuation of that already published in the *Agricultural News* (Vol. V, p. 179):—

The Colonial Office—to the Imperial Commissioner of Agriculture.

Downing Street,
September 17, 1906.

Sir,—With reference to the letter from this Department of April 11 last, I am directed by the Earl of Elgin to transmit for your information, a copy of a letter received at the Foreign Office from His Majesty's Consul at Batavia, forwarding a report on the successful competition of Java sugar in the United States and in the United Kingdom. I am to state that it has been ascertained from the Foreign Office that there would be no objection to the publication of this report in the Bulletin of the Department of Agriculture.

I am at the same time to transmit to you for your information, a copy of a report on the Federated Malay States and Java, by Senator Smith of the Parliament of the Commonwealth of Australia, and to draw your attention to the account of the Java sugar industry at pp. 57 and 58.*

I am, etc.,

(Sgd.) C. P. LUCAS.

British Consulate, Batavia,
August 1, 1906.

Sir,—With reference to Foreign Office despatch No. 1, Commercial, of April 6, 1906, I have the honour to transmit to you a short report on the successful competition of Java sugar in the United States, and in the United Kingdom.

I have, etc.,

(Sgd.) H.B.M.'s CONSUL.

With reference to the increase in the imports of Java sugar into the United Kingdom from 22,463 tons in 1903 to 93,453 tons in 1904, and to 118,899 tons in 1905, I would remark that from inquiries instituted by me, I attribute this, not to the superiority of the Java product, but to the speculation in the article generally, which became manifest in 1904. The low prices, which had some time previously been ruling, stimulated consumption to such an extent that stocks became reduced to an abnormally low level. In addition to this, the continued warm weather experienced on the continent of Europe during the spring and summer of 1904 had a prejudicial effect on the growing beet, and those interested in sugar foresaw an approaching shortage of supplies. Towards the end of 1904, it became apparent that speculation had been overdone, and that the United States could not absorb the enormous quantities which had been purchased for shipment during 1905, to that quarter. Speculators gradually became anxious to dispose of their holdings and sought the markets which appeared to have become the least sensitive to the decline, with the result that several parcels were disposed of to Liverpool and Greenock.

* Extracts from this report will appear in the next issue of the *Agricultural News*. [Ed. A.N.]

The very remunerative prices, which the Java planters obtained for their product in 1904, enabled them to improve their machinery, with the result that few indeed of the Java factories are now not fitted up with the most modern appliances.

For some years past, experiments have been made with a view to ascertaining which species of cane would be most suitable. Foreign canes have been imported but have not proved a success. Cane grown from seedlings has also practically been abandoned owing to the necessity and consequent expense of having to be nurtured in gardens in the hills. A few varieties of the indigenous cane are now regarded as being the most satisfactory, and this result has only been arrived at after a continued process of careful selection. The two experimental stations in Java have done, and continue to do, much towards assisting planters in determining which species of cane is most suitable to the peculiarities of the soil.

The question of manuring has, of late years, been engaging the attention of planters, and experience has now taught them that the systematic and plentiful application of sulphate of ammonia and other nitrogenous fertilizers to the impoverished soils has amply rewarded them in the form of increased production. It may not be out of place to mention here that grounds which have been utilized for sugar growing during one season are not used for the same purpose during the next, but are planted with rice or some other article.

The improvements in the machinery alluded to above, together with economical management, have enabled Java factories to reduce the cost of production to such an extent that sugar prices will have to reach a much lower level than the lowest point touched during the past few years, to cause any serious apprehension to Java planters. From particulars which have been placed at my disposal, it would appear that a production of 1,200 piculs (1 picul = 136 lb. Eng.) of cane or 125 piculs of sugar per planted bouw (1 bouw = 1.7537 acres) is by no means above the average. The cost of production naturally varies considerably, but it seems to be a generally accredited opinion that a factory which cannot deliver sugar, in the quality suitable for British, American, Hong Kong, and Japanese markets, at the equivalent of 6s. 6d. per cwt., f.o.b., basis 96° polarization, is by no means up to date. For the sake of facilitating comparison, I may say that this would work out to be equal to about 7s. 10½d. to 8s. per cwt., c.i.f. United Kingdom or United States port.

Whether the Java article contains some inherent property which renders it more attractive to the refiners in the United States than the sugar produced in the West Indies, I am unable to ascertain. I am also unaware what minimum polarization is guaranteed by West Indian sugar sellers, but the solution may possibly lie in the fact that Java sugar cargos are guaranteed not below 95° average on shipment, and I am informed that this minimum has only on very exceptional occasions been approached, the bulk of the sugar from this island shipped to the United States turning out generally above 96½°.

Cacao in San Domingo. The quantity of cacao exported from this port in the year 1905 was 9,642,898 lb. The varieties of cacao planted here are Caracas, Cuban, and Guayaquil. The last named gives the best results, as it withstands drought better than the others. The hearts of all these beans are purple, the colour most preferred. The price paid for cacao at present is \$7.50 per quintal (110 lb.). The production throughout the country is increasing at the rate of 15 to 20 per cent. per annum. (*U. S. Monthly Consular Reports*.)



WEST INDIAN FRUIT.

CITRATE OF LIME FROM DOMINICA.

As briefly announced in the *Agricultural News* (Vol. V, p. 268), the first shipment of citrate of lime on a commercial scale was recently made from Dominica. As it is likely that the manufacture of citrate of lime will now be taken up in Dominica on a considerable scale, much interest attaches to the following note, which has been forwarded for publication by Mr. J. Jones, Curator of the Botanic Station:—

Citrate of lime is now being shipped from Dominica on a commercial scale for the first time. The question of making citrate of lime instead of concentrating the lime juice, has exercised the minds of several planters in Dominica for a long time. As far back as 1902, the Hon. Dr. F. Watts gave a demonstration of the process of making citrate of lime before an assembly of planters at the Bath estate works. Dr. Watts also wrote a paper on the subject, which was published in the *West Indian Bulletin*, Vol. II, p. 308. The matter was also discussed before the local Agricultural Society.

It is only during the present year that the matter has been actively taken up, and the first shipment made. The reports on this product have been uniformly favourable, the citrate of lime being quite crystalline, and containing 69 per cent. of citric acid. It was stated to be equal to the best Sicilian citrate.

To make citrate of lime demands greater skill than the concentration of lime juice and the expense is probably greater. Chalk has to be imported, driers erected, while the consumption of fuel in drying the citrate is very considerable. On the other hand, the planter who makes citrate produces a superior product, which commands a higher price than concentrated lime juice; also the great loss of citric acid that is known to occur when boiling down lime juice, is prevented.

It is found that evaporators built on the principle of the cacao drier at the Botanic Station are suitable for drying citrate. Particulars of this drier were given in the *West Indian Bulletin*, Vol. II, p. 173.

Now that a successful start has been made, it is likely that Dominica will follow the example of Sicily, and in the course of a few years it may be that all the lime juice intended for citric acid makers may leave the island in the form of citrate of lime.

It may be added that the treasury returns show that 30,045 lb. of citrate of lime had been shipped from Dominica up to September 30 last.

COCOA-NUT INDUSTRY IN PANAMA.

The *U. S. Monthly Consular Reports*, for June, contain the following interesting account of the cocoa-nut industry in Panama. The industry is at present confined to the exportation of nuts, no copra or cocoa-nut oil being shipped:—

The largest percentage of cocoa-nuts shipped from this district is gathered by the San Blas Indians, who occupy a strip of coast territory extending on the Caribbean Sea from Point San Blas to Cape Tiburon, a distance of 125 miles. The largest percentage of cocoa-nuts from the San Blas coast is traded by the Indians to the masters of small coasting schooners, who give in exchange manufactured articles, such as prints, machetes, shotguns, hats, shoes, etc. Most of these cocoa-nuts are shipped to the United States direct.

The cocoa-nuts exported from Colon and vicinity are raised principally by native Panamans on small plantations of 500 to 1,000 trees. The only large plantation is that of the Caribbean Cocoa-nut Company, located at Toro Point, just across the bay from Colon, and owned by an American. This holding is the only one of any size, and consists of about 20,000 trees. The fruit grown on this plantation and on the small native places are shipped to the United States by steamers at the freight rate of \$4 a thousand. No cocoa-nuts are dried and shipped as copra, being simply husked, and no use is made of the fibrous material enveloping the shell.

From the entire consular district of Colon about 5,000,000 to 6,000,000 cocoa-nuts are exported to the United States annually. The number of cocoa-nuts shipped from Colon to the United States during 1905 amounted to about 1,500,000, and were valued at \$54,600. The market price of prime cocoa-nuts fluctuates from \$15 to \$25 a thousand, according to the demand.

In selecting land for planting cocoa-nuts, light and free soil should be chosen for nursery purposes, and the seed nuts should be selected from the produce of healthy, heavy-bearing trees. The nuts are placed about 6 inches in the ground and 2 feet apart. When about eight months old the young palms are transplanted from the nursery direct to the field, and placed about 18 feet apart. In the best lands the tree should bear in the fifth or sixth year. After the palms are six years old, they require very little attention, except to keep them free from weeds and other plants. Of course, the better the cultivation the larger the fruits and the better their quality.

WEST INDIES AT THE CANADIAN EXHIBITIONS.

The illustration on this page (fig. 22) shows the West Indian exhibit at the National Exhibition opened at Toronto on August 28. Press notices on the exhibition devote considerable space to the West Indian section. The following reference is made in the *Canadian Grocer* under the heading 'Wealth of the West Indies':—

One of the most instructive and interesting exhibits is that of West Indian products in the Process Building. It contains upwards of 2,500 examples of the agriculture and manufacture of the Caribbean Archipelago. Most of them are food stuffs, but there are many samples of cotton, commercially recognized as the best in the world. The whole has been arranged by and is under the direction of Mr. Pickford, of Pickford & Black, whose line of steamships is the principal means of communication between Canada and the West Indies. The display is a credit to his taste and judgement. Though a little too confined for the best results, the public are admitted within the enclosure and may examine as minutely as they please the hundreds of articles.

by the Norbrook Canning Company, of Kingston. Another feature of the same exhibit is a case showing the different brands of cigars put up by the El Caribe Cigar and Tobacco Company, of Kingston.

Bermuda has an exhibit of pickled onions. All the other British Islands are represented and the show cannot fail to be of great benefit to the West Indies. The display has already been inspected by thousands, and every one is astonished to note the wonderful resources of the islands. Messrs. Pickford & Black are certainly to be congratulated on having arranged with the West Indies and secured such a magnificent exhibit, and on the enterprise shown in the erection of such a fine and successful display.

The following note on the success of the West Indian exhibit at the Canadian exhibitions, dated Halifax, October 9, appeared in the public telegrams, received in the West Indies on October 10:—

The Canadian papers to-day speak in the highest terms of the display of the West Indian products at the Toronto and Halifax Exhibitions which have just closed. The Grand Gold



FIG. 22. THE WEST INDIAN COURT AT THE CANADIAN EXHIBITIONS, 1906.

In regard to the West Indian exhibit at the Dominion Exhibition at Halifax, the *Halifax Daily Echo*, of October 1, says:—

Mr. Charles Pickford has succeeded in arranging the exhibit in a very attractive manner, and it is one of the finest at the show. This is the first time the people of the Maritime Provinces have had an opportunity of seeing the principal products of the West Indies grouped together.

British Guiana has a fine exhibit, consisting of sugar, rums, woods, cacao, cattle foods, etc.

Dominica's display consists of cacao, lime juice, vanilla, and nutmegs.

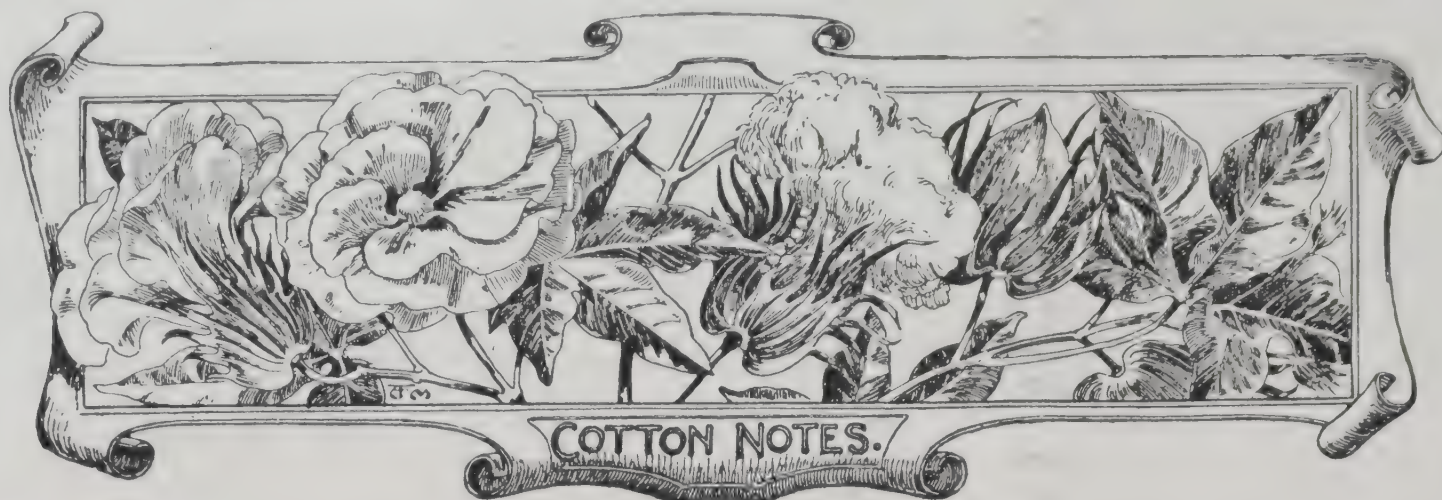
Grenada shows cacao and all kinds of spices.

Barbados has a fine collection of molasses, sugars, rum, honey, cotton, etc.

A feature of the Jamaica exhibit is canned fruits put up

Medal has been awarded for the exhibition as a whole, and an additional gold medal for Jamaica cigars. The most representative and attractive of the exhibits were from British Guiana and Barbados, and following closely were excellent exhibits from Grenada, Dominica, and St. Kitt's. A fine trophy of arrowroot put up in attractive packets was from St. Vincent, and an interesting collection of preserved fruit from the Norbrook factory at Jamaica.

At the recent meeting in the Board of Trade rooms, the opinion was expressed that it was desirable that further efforts be made to bring about still closer relations between Canada and the West Indies. The striking fact was elicited that out of 200,000 tons of sugar that entered Canada last year 160,000 tons, or four-fifths of the whole, were received from the West Indian Colonies. The visit of the Imperial Commissioner of Agriculture for the West Indies and the information supplied by him were greatly appreciated.



ST. VINCENT COTTON FACTORY.

The following information is extracted from a report by the Agricultural Superintendent on the working of the St. Vincent Cotton Factory for the 1905-6 crop:—

The factory was again worked under the control of the Imperial Department of Agriculture, the Agricultural Superintendent being responsible for the proper carrying on of the work.

The machinery gave no trouble and ran smoothly throughout the period mentioned above, and I might add here that not a single gin-knife was broken. Considering that the crop was the heaviest so far handled, this point must be taken as reflecting much credit on the officers concerned in working the factory.

The factory was opened for the receipt of seed-cotton on December 5, 1905, and on December 21, ginning was started and continued at fairly regular intervals until May 9, when work was finished.

The total weight of seed-cotton sent to be ginned was 435,671 lb., which gave 121,174 lb. of lint. The percentage weight of lint to seed-cotton for the whole crop was 27·8, or slightly higher than last season. At the commencement of the season, the percentage weight of lint to seed-cotton was as low as 25 per cent. This was due, in some measure, to the insufficient drying of the seed-cotton. The percentage gradually rose during the months of February, March, and April, and in one case it worked out as high as 35 per cent.

A large amount of seed-cotton was insufficiently sunned and opened before being sent to the factory, which caused a loss in ginning, lint passing through the grids of the gins with the seed. In one case, the seed-cotton sent in was so damp that, when stored, a considerable amount of heat was generated.

The 121,174 lb. of lint above mentioned were made up into 362 bales, the majority of which contained 360 lb. net.

ANTIGUA COTTON FACTORY.

A special meeting of persons interested in the Antigua cotton industry, presided over by his Excellency the Governor, was held at the Agricultural Society's room on Friday, September 21, for the object of receiving the report of a committee appointed in April last to formulate proposals for the formation of a company to take over and work the Government cotton ginnery.

After a few introductory remarks, his Excellency called upon the Hon. D. McDonald to read the report, which was as follows:—

The committee appointed by his Excellency the Governor to consider the formation of a company to take over the working of the ginning machinery now run by the Imperial Department of Agriculture beg to report as follows:—

By the kindness of his Excellency, we had the advantage of an interview with Sir Daniel Morris and Dr. Watts immediately the committee was appointed, and Sir Daniel gave us all possible information regarding the formation and working of the ginning association in Barbados.

At this meeting it was agreed that the committee should ascertain from the local Government and from the British Cotton-growing Association what sums they would be willing to take for their respective interests in the present factory, and on what terms a transfer would be made.

The local Government agreed to accept the sum of £40 for their interest in the factory in Antigua, and to rent the building at a nominal rent of 6d. per year, subject to the condition that the association would keep the building in order, or that the Government should charge by way of rent a sum sufficient to cover the cost of repairs.

The British Cotton-growing Association at first offered to exchange their interest in the plant for shares; the committee objected to this offer, and the Honorary Secretary wrote on June 22 offering the association, as authorized by the committee, the sum of £175 cash for their interest in the factory, asking at the same time for a reply by cable. A cable reply was received on August 29 accepting this offer. . . .

It now remains for the cotton growers, knowing the terms on which the entire machinery can be purchased, and having the working of that factory for the last crop before them, to form an association to take over and run the factory.

COTTON IN ST. MARTIN.

Mr. D. J. vanRomondt writes to the St. Kitt's *Daily Express* that there is now an area of 800 acres in St. Martin devoted to the cultivation of Sea Island cotton. The cotton that has been produced during the last two years has sold in the Liverpool market at prices rivalling those obtained in neighbouring islands.

This year 100 bales of Sea Island cotton have been exported from St. Martin, and it is estimated that, should weather conditions continue favourable, there will be an increase of 500 per cent. next season.

Cotton Worm in St. Vincent. Although the cotton worm has made its appearance this season in St. Vincent, it has not, so far, done any extensive damage. This is apparently to be attributed to the work of its natural enemies in keeping it in check. Planters are advised to be prepared to dust their cotton with Paris green if necessary.

SCIENCE NOTES.

Soap Berry Tree.

There are various plants known as soap berry trees. These belong to the genus *Sapindus* and are found in the old and new worlds. One species, *Sapindus Saponaria*, is a native of Jamaica and tropical America. The fleshy covering of the seeds of this tree makes a lather with water and may be used as a soap.

The *Consular Report* on agriculture in Algeria for 1905 contains the following account of the Algerian soap tree:—

The *Sapindus utilis* is a large tree with a smooth straight trunk. The new plants reach to about 10 feet in height in the first two years and begin to bear in six years, but the fruit production increases largely as the tree gains in age. The flowers are male and female, or hermaphrodite. The berry is round in appearance, but with a distinct keel, like a walnut's, encircling it. It is, when fresh, smooth, shiny, and fleshy; when dried it is tough, gummy, and translucent; the colour varies from yellowish-green to brown; in size, it varies from about $\frac{1}{2}$ inch to 1 inch in diameter; dried, it weighs from $\frac{1}{8}$ to $\frac{1}{4}$ oz. The seeds form about one-third of the total weight. The tree, when full grown, rises to a height of from 40 to 50 feet, and produces over 200 lb. of fruit, worth at present from \$6 to \$7.

Several varieties have been produced from seed, but have given poor results. The only practical method of reproduction is from cuttings, which should be planted in February in Algeria and similar climates, and must be copiously watered during the summer.

So far the cultivation of this tree in Algeria has been limited to the lowlying lands near the coast (the orange belt), but it is believed that it would survive a more severe climate. The only large plantation of these trees is about 18 miles from Algiers, covering some 150 acres, but there are many small plantations, and recently the cultivation of the tree is being largely undertaken and is considered to have a brilliant future before it.

There are no important manufactures of soap tree products in Algeria; all the production of the plantation mentioned above went last year to Germany. A good deal of the fruit is employed in its natural state, and many chemists produce specialties from it, such as saponine, an excellent washing powder, and sapindine, a hair wash, as well as many other articles for toilet purposes.

Panama wood, which is extensively used in Europe for washing, contains, on an average, about 8 per cent. of saponine, whilst the dried fruit of the soap tree contains fully 28 per cent. When freight has to be taken into consideration, the importance of this difference can easily be estimated.

The wood of this tree is also valuable. It is fine in grain, takes a good polish, and is very suitable for furniture. The seed yields a considerable quantity of fine oil.

Love Vine or Cuscuta.

At a meeting of the Barbados Agricultural Society held on September 28, Mr. J. R. Bovell drew the attention of members to the existence in the island of a scourge to agriculture in the form of a species of *Cuscuta*, known as the 'love vine.' After explaining the nature of this pest and the injury it was likely to cause to vegetation, Mr. Bovell

proposed that a committee should be appointed to consider what steps should be taken for its destruction.

As a result, a notice has been issued by his Excellency the Governor calling attention to the dangerous nature of the 'love vine,' and asking for 'the co-operation of every man, woman, or child in the island in the destruction of this pest.'

This pest became so serious a menace to the agricultural interests of Trinidad two or three years ago that steps had to be taken to deal with it by legislation. As mentioned in the *Agricultural News* (Vol. III, p. 185), power was given, under the Agricultural Protection Ordinance, to the Chief Inspector, with the approval of the Governor, to sign an order for the destruction of the 'love vine' by burning or burying. A leaflet giving information as to the habits of the pest, issued by the Botanical Department of Trinidad, was summarized in the *Agricultural News* (Vol. II, p. 342).

There are some eighty species of *Cuscuta* known to science, all of which are parasitic on other plants. They are leafless twiners, which attach themselves to the host-plant by means of root-like suckers, which absorb ready-made food from the host. The seeds produced by the parasite fall to the ground and germinate in the soil in the usual way. As soon, however, as the young shoot finds an acceptable host, the root, for which there is now no further use, dies, and the plant becomes parasitic. If left undisturbed, the vine will, in time, completely destroy its host-plant.

While the 'love vine' is readily distributed by its seeds, it is also reproduced vegetatively. Small portions are able to attach themselves to a host-plant.

It will therefore be understood that, to destroy the pest completely, efforts should be made to prevent it from seeding and then to pick off and destroy, by burying deeply with lime, or burning, every portion that can be seen.

In Great Britain four species of *Cuscuta* are found, the most important being *C. trifolii*, which is known as the 'clover dodder.' An interesting article on the dodders appeared in the last issue of the *Journal of the Board of Agriculture* (September 1906). They are chiefly distributed by seed included amongst agricultural seeds. For example, in 1905 as many as 11 per cent. of the clover seed samples examined by the Botanist to the Royal Agricultural Society were condemned owing to the presence of dodder seeds.

It is stated: 'The harm done is best explained by stating that dodder possesses no chloroplasts, and is unable to take up carbon dioxide from the air like ordinary green plants; but, after leaving its hold of the soil, it depends entirely for its food products which it absorbs from its host-plant, which therefore becomes exhausted and dies.'

RAINFALL IN ST. LUCIA.

Mr. J. C. Moore, Agricultural Superintendent, has forwarded the following report on recent rainfall in St. Lucia:—

Very heavy rainfall was experienced in St. Lucia on September 23 and 24. At the Agricultural School, 7.85 inches were registered for the two days. About 4 inches fell between 4 and 6 a.m. on September 23, causing the Union river to rise 13 feet and flood the whole of the experiment plots attached to the school. Considerable damage was done by silting up the drains, laying down various plants (including cacao trees), washing out newly planted banana plants, destroying all the onion seedlings, and washing away considerable quantities of the best surface soil from some of the plots. The rainfall at this station, for the current year to September 30, is nearly 5 inches above the amount registered for the corresponding period last year.

EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming, should be addressed to the Commissioner, Imperial Department of Agriculture, Barbados.

All applications for copies of the 'Agricultural News' should be addressed to the Agents, and not to the Department.

Local Agents: Messrs. Bowen & Sons, Bridgetown, Barbados. *London Agents:* Messrs. Dulau & Co., 37, Soho Square, W., and The West India Committee, 15, Seething Lane, E.C. A complete list of Agents will be found on page 3 of the cover.

The *Agricultural News*: Price 1d. per number, post free 1½d. Annual subscription payable to Agents, 2s. 2d. Post free, 3s. 3d.

Agricultural News

VOL. V. SATURDAY, OCTOBER 20, 1906. No. 117.

NOTES AND COMMENTS.

Contents of Present Issue.

The subject of fungus diseases of plants and their prevention is dealt with in the editorial of this issue.

A report on the sugar industry of Java appears on p. 323.

Mr. J. Jones, Curator of the Botanic Station at Dominica, contributes an interesting note on the manufacture of citrate of lime. (See p. 324.)

On p. 325 will be found an illustration showing the West Indian exhibit at the Canadian Exhibitions. The great success of this section and the interest aroused by it are referred to in all the press notices on the exhibitions.

Action is being taken in Barbados to secure the destruction of the 'love vine.' A brief account of this parasitic plant appears on p. 327.

Among the notes on insect pests on p. 330, mention is made of a new sugar-cane pest in Trinidad, which proves to be one of the 'spittle insects' or 'frog-hoppers.'

An interesting trial of various fodder plants has been made at the Dominica Agricultural School. A brief report on the results will be found on p. 333.

In view of the efforts that are being made to extend the cultivation of the *Castilloa* rubber tree in the West Indies, considerable interest attaches to the article on this subject on p. 334.

Botanic Station Reports.

The issue to-day of the Annual Reports on the Botanic Station, Agricultural School, and Land Settlement Scheme in St. Vincent, for 1905-6, completes the publication of the reports on the local agricultural departments throughout the West Indies for the year ended March 31 last.

These reports form an interesting summary of the efforts for the improvement of agriculture in the several islands; for, in addition to dealing with the details of the work in the Botanic Stations, the local officers have prepared valuable reports on the progress in the establishment of minor industries and experimental work in connexion therewith. Of special interest are the reports on the progress of the cotton industry.

In the case of St. Vincent, St. Lucia, and Dominica reports are furnished by the Officers-in-charge of the Agricultural Schools, in which much useful work is being accomplished.

These reports can be obtained of all the agents for the sale of the publications of the Imperial Department of Agriculture at a cost of 3d. or 6d. each.

Colonial Fruit Shows.

As already stated in the *Agricultural News* (Vol. V, p. 277), the next Colonial Fruit Show, to be held by the Royal Horticultural Society, has been fixed for December 4 and 5.

The Imperial Commissioner of Agriculture is firmly of opinion that every effort should be made to secure an exhibit of West Indian fruit for this show. It is a matter that the Permanent Exhibition Committees in the Windward and Leeward Islands and Barbados should take up at the earliest opportunity. They are invited to communicate with the Imperial Commissioner of Agriculture or the local officers of the Department, who will be ready to render any assistance in their power.

In regard to funds for meeting the necessary expenditure, it is suggested that resolutions might be passed by the Agricultural Societies, asking the various Governments to contribute a share of the expenses. Jamaica, British Guiana, and Trinidad might be asked to vote £20 each, and Grenada, Barbados, Dominica, and St. Lucia £10 each.

Cacao in British Guiana.

Reporting on the Essequibo and Pomeroon Rivers district of British Guiana for the year 1905-6, the Commissioner refers to the suitability of some parts of the lands on the Essequibo and on its tributaries to the cultivation of cacao.

It is interesting to note that cacao was presumably planted by the original Dutch settlers, although no one can speak definitely of its origin. Mr. McTurk says: 'I have found large cacao trees in what is now forest wherever there are old Dutch graves, some of them, from their inscriptions, nearly 200 years old.'

It may interest some persons to know that cacao grows wild on the banks of the Rio Branco, near Fort

San Joaquin, not many miles from our south-western frontier.'

On the Pomeroon, cacao does not appear to thrive so well as in many other parts of the colony. This Mr. McTurk attributes to want of deeper drainage, rather than to any inherent defects in the soil.

Agricultural News.

In consequence of the adoption of a better class of paper, with a view to obtaining better results with the blocks used for illustrating the *Agricultural News*, single copies of this publication now require 1d. for postage.

It has therefore been decided to raise the post-free subscription rate from 3s. 3d. to 4s. 4d. per annum. Subscribers and local agents will kindly note that this change will be made at the commencement of next year.

Planters and Pupils.

It is desired to draw attention to the following announcement in the *West India Committee Circular*:—

Being constantly asked for the names of planters willing to receive pupils or visitors on their estates for a small premium or weekly payment, it has been decided to insert advertisements from such planters for the nominal sum of 10s. per annum in a special column which will be provided for this purpose. It is believed that this will be the means of placing intending settlers into communication with the planters in the West Indies, and will prove of mutual advantage, and from the numbers of inquiries which have been received, there is no doubt whatever that this arrangement will prove advantageous if generally supported and taken up.

In view of the many inquiries received by this Department of a similar nature to those mentioned above, it is thought that this proposal of the West India Committee is likely to prove a very useful move.

Cotton Seed as a Human Food.

A review of the cotton seed industry, in the *U. S. Monthly Consular Reports*, for June, contains some interesting facts in regard to the uses of cotton seed. Last year 4,500,000 tons of seed were bought from the southern planters, and the sum of \$75,000,000 was paid to them, thus adding practically 25 per cent. to the value of the cotton crop. It is likely that a recognition of the value of cotton-seed meal as human food will further increase the value of cotton seed. Professor J. H. Connell, of Texas, exhibited at a recent meeting of the Cotton Seed Crushers' Association at Atlanta, Georgia, samples of biscuits and cakes made from a combination of cotton-seed meal and wheat flour, which were pronounced to be delicate and tasty.

For cooking purposes cotton-seed oil was, he said, equal in all respects to the best lard. By an invention of comparatively recent times, cotton-seed oil could be freed from the impurities which gave it a rank odour. So-called olive oil contained a large percentage of cotton-seed oil.

West Indies at the Canadian Exhibitions.

Elsewhere in these columns is published a short account of the West Indian exhibits at the Canadian National Exhibition at Toronto and the Dominion Exhibition at Halifax. It is evident from the press reports that considerable interest has been attracted by this section at both exhibitions.

It will be remembered that the Imperial Department of Agriculture, realizing the advantages that were likely to accrue to the West Indies by reason of closer commercial relations with the Dominion of Canada, impressed on the various Governments the advisability of securing the adequate representation of these islands at the Canadian Exhibitions. Permanent committees were appointed in most of the islands, to which was deputed the work of collecting and forwarding exhibits.

All who have taken part in this work are to be congratulated upon the success that has met their efforts and upon the lively interest that has been attracted by the West Indian exhibits on the part of Canadian manufacturers and also trade representatives from the United States, who visited the exhibitions in great numbers.

As previously mentioned in the *Agricultural News*, the Imperial Department of Agriculture issued a special handbook containing information in regard not only to the exhibits, but also to the economic resources of the West Indies. This course was evidently much appreciated. As an instance of the educational value of the exhibition, the *Canadian Grocer* mentions the case of a teacher who asked for a supply of these handbooks to enable him to give one to each of his pupils.

On p. 325 of this issue of the *Agricultural News* there will be found an illustration of the West Indian exhibit.

The World's Cacao Trade.

According to the figures published in the 'German Cacao Trade Journal,' there has been a steady increase in the world's cacao production since 1901. The principal producers, Ecuador, Brazil, Trinidad, San Domingo, Venezuela, and Grenada have all shown very considerable increases in their output. The production is also largely increasing in British West Africa, the German Colonies, Cuba, and Porto Rico.

'Planting of high-grade cacao is not being carried on to the same extent as that of the cheaper varieties, which may be accounted for by the fact that cacao is no longer merely a luxury, but is becoming a staple article of food even among the working classes, this end having been brought about by improved manufacturing methods which have enabled the lower grades of cacao to be handled to advantage.'

In regard to the world's consumption of cacao, the United States led in 1904, using 33,159 tons. Germany followed with 27,101 tons, France with 21,799, the United Kingdom with 20,552, and the Netherlands with 21,124 tons. Hamburg has become the leading centre of the cacao trade, having surpassed Havre and New York. London is losing ground year by year.



INSECT NOTES.

A New Sugar-cane Pest.

During the past few months sugar-canes in Trinidad have been attacked by a small insect of the group known as spittle insects or frog-hoppers.

The name spittle insect is given on account of the peculiarity of the immature insect in covering itself in a mass of white froth which is voided from the tip of the abdomen, and which forms a complete hiding-place or covering for the insect within. The name frog-hoppers was probably derived from the name of frog-spittle, formerly given to the frothy mass, and from the leaping habit of the adult.

The frog-hoppers belong to the family *Cercopidae*, of the order Hemiptera, and are therefore related to the principal insect pests with sucking mouth-parts, such as scale insects, plant lice, plant bugs, cotton stainers, etc.

Specimens of infested cane stumps and of the adult insect have been forwarded from Trinidad to the Head Office of the Imperial Department of Agriculture, and the following account is based on examination of these specimens.

The adult insect is about $\frac{5}{16}$ inch in length, and about half as wide. The head and thorax are dark greenish, the wing-covers light-brown with two narrow whitish bands running across them. The head is stout and broad, the eyes prominent, and there are two small simple eyes on the upper surface of the head between the large compound eyes. The antennae are short and hair-like, except the base, which is much thickened. The legs are dark-brown and slender; the wing-covers are somewhat thickened, while the under wings are pale, tinged with smoky-brown, and with violaceous reflections. The immature specimens, so far examined, are all in the last larval stage of development. The bodies are whitish, tinged with pink or red, the head and thorax being darker. The developing wings are seen as dark, elongated pads lying on the basal part of the abdomen.

The adults have not been observed in the act of feeding. The immature insects seem always to place themselves on young tender roots, and it is probable that they are unable to penetrate the hard rind of the cane with their beaks. They have been found feeding at a distance of 4 inches below the surface of the soil.

Mr. J. H. Hart, in a letter to the Imperial Commissioner of Agriculture, states that this insect appeared a few years ago in Trinidad, during such a season of constant wet weather as the present has been, and the fact that it has remained comparatively unknown since that time would indicate that it becomes a pest only in seasons unfavourable to the cane.

The insect will probably prove to be a species of *Tomaspis*, perhaps *T. bicincta*.

It may be added that the specimens of cane stumps forwarded for examination were attacked by the root fungus (*Marasmius*), and several of the canes had been completely tunelled out by some boring insect, so that it is quite likely that the unfavourable condition of the cane fields from which the specimens were taken may be largely due to other causes than the frog-hoppers.

Proliferation in Cotton Plants.

The Bureau of Entomology of the U. S. Department of Agriculture has recently issued a bulletin (No. 59) entitled 'Proliferation as a Factor in the Natural Control of the Mexican Cotton Boll Weevil.'

It is shown that the buds and bolls of cotton have the power of producing a growth of loose tissue, when wounded by insects or otherwise, which seems to be an effort on the part of the plant to offset or check the injury. The amount of loose tissue produced in this proliferation is in many cases sufficient to fill the cavity or wound, and when the larva or pupa of the boll weevil is in such a cavity, it is crushed by the pressure of the growing plant cells.

Proliferation has been found to occur in upwards of 50 per cent. of the buds and bolls injured by the boll weevil which were examined, and the different stages of the weevil were killed by the pressure of the proliferation in 13.5 per cent. of the buds and in 6.3 per cent. of the bolls.

While this power of adaptability may not by itself become a powerful factor in the control of the boll weevil, it may be turned to good account when taken into consideration with other characters in selecting weevil-resistant cotton, and is, at least, interesting as showing the power of adaptation on the part of the plant. Probably also the insects will develop characters to offset more or less the proliferation of the cotton, which, if left entirely to natural courses, would tend to establish an immunity to its effect.

West Indian Digger Wasps.

In a recent paper on the digger wasps of North America and the West Indies (*Proceedings of the U. S. National Museum*, Vol. XXXI, pp. 291-423), Dr. H. T. Fernald mentions a peculiar case in the identity of two species of these wasps. The last paragraph under the heading of *Chlorion spiniger* is as follows:—

I have studied examples of *Chlorion spiniger* from Florida, Louisiana, Mississippi, Texas, Santo Domingo, Barbados, Dominica, and Trinidad. Kohl records it from Mexico and Brazil. In quite a large lot of specimens of *Chlorion* from the above-named West India Islands all the males were *spiniger* and all the females *dubitatum*, which is rather suggestive of a relation between these species, and which is considered under *dubitatum*.

The last paragraph of the consideration of *Chlorion dubitatum* is as follows:—

Accepting *dubitatum* as a good species, we find that all the specimens are females. A closely related species is *spiniger*, of which only males are known, found in the same territory, and in quite a collection of these insects from the West Indies which I have studied, every female was *dubitatum* and every male was *spiniger*. Taking these facts into consideration, I am of the opinion that these species will ultimately prove to be identical.

Green Page Moth. At the present time a moth is being found in Barbados which was noticed in that island during the gale of August 26, 1901. This is the green page moth (*Urania teilus*), which is native of South America, and frequently appears in Trinidad in large numbers. About a year ago several specimens of this insect were caught in Barbados, and it seems probable that it is breeding there. The food plant of the caterpillar in Trinidad has been determined as *Omphalea megacarpa*. (See *Agricultural News*, Vol. I, pp. 56 and 168, and *West Indian Bulletin*, Vol. III, p. 236.)

CACAO CULTIVATION IN CEYLON.

Mr. Herbert Wright has contributed to the *Tropical Agriculturist* a valuable article on the above subject. The following extracts from this article are of general interest:—

It is a matter of common knowledge that the value of Ceylon cacao has, during the last few years, fallen considerably, and had it not been found that this product could be profitably cultivated as a permanent intercrop with Para and Castilloa rubber, the industry would, in all probability, have remained stationary. While the value of Ceylon cacao has recently shown a decline, that of many other countries has not done so, and judging from the numerous local applications regarding the varieties to be selected, the suitability of each kind in conjunction with rubber, and other matters, it appears necessary to consider our position and see what improvements are possible. In the Matale, Kurunegala, Dumbara, and other districts, the combined cultivation—cacao and rubber—is rapidly extending, and seems likely to prove a very remunerative one.

From a statement showing the quantity and value of cacao exported from Ceylon during the years 1875 to 1905, it is seen that the quantity exported has steadily increased until a total of 69,431 cwt. was reached last year. The value per cwt. was, however, lower in 1905 than at any time, with the exception of the year 1896, during the past twenty years. Mr. Wright continues:—

The price of Rs. 70 per cwt. obtained in 1892, as against that of Rs. 35 per cwt. in 1905, takes us back to the most vital consideration, i.e., the variety or quality of the cacao grown and exported during these periods. Since the ravages of the disease or diseases affecting the stems and pods first became prominent in Ceylon, there has been a tendency to replace the old Criollo or Caracas variety with the more prolific varieties of Forastero and Amelonado, in the belief that the latter was not as liable to the ravages of parasitic fungi. Now, however, the planters are beginning to realize that all varieties of cacao at present cultivated in Ceylon are liable to be affected by the same diseases, and when the latter appear in the fluted and high stems of the Forastero variety, they are very difficult to excise effectively. There has been, during the last two or three years, a distinct tendency to plant the old Caracas type in preference to the Forastero; the change of variety can be shown to be one of the factors responsible for the varying value placed upon the cacao exported from Ceylon.

During recent years the cultivation of shade trees for cacao has also undergone considerable change, and whereas the original plantations contained mixed species of forest types or a preponderance of *Erythrina umbrosa*, they are now giving way to *Hevea brasiliensis*, *Erythrina lithosperma*, *Castilloa elastica*, etc. Furthermore, the results of experiments indicate that the shade of *Erythrina lithosperma* need not be permanent throughout the whole year, but may be treated so as to form a shade of varying intensity according to the seasons.

In all the species mentioned above there is observable one important and common agreement, i.e., they all change their foliage annually and return large quantities of organic matter, in the form of leaves, to the soil. Methods of manuring have also changed, to some extent, during the period under consideration, and the effect of the change in modes of cultivation can be shown to affect the quantity or quality of the article produced. The Ceylon methods of cultivation,

particularly with regard to pruning, weeding, and manuring, are almost unique, and the differences observable in Surinam, Trinidad, Samoa, Cameroon, etc., provide interesting material for our consideration.

In Ceylon the methods of fermenting, washing, and curing are often quite different and sometimes quite in contradiction to those of other countries, and the effect of these processes on the quality of the article is only too fully recognized. In the opinion of many, the condition of the trees, whether they are free or suffering from disease, is of importance in determining quality and quantity.

It is therefore obvious that there are several factors which need to be considered in connexion with the present and past condition of the cacao industry in Ceylon.

PACKING CACAO SEEDS.

The following note on the packing of cacao seeds appeared in the *U. S. Monthly Consular Reports* for March:—

Consul-General Heimrod submits a method of packing cacao seeds for export which has been practically tried in Samoa with excellent results, and which he believes may be of special value to planters in the Philippine Islands.

The seeds should be selected from ripe pods and well washed in water, then placed on a rough towel and gently rubbed in order to remove most of the pulp, taking care not to damage the skin. The seeds are next placed in a current of cool air for twenty-four hours. The packing material is composed of equal parts of vegetable mould and finely ground or pounded charcoal, moistened just enough to resemble earth taken out of a shaded place. If the packing material is too wet, the seeds will rot; and if not moist enough, the seeds will absorb all the water and perish. A tin box, 8 by 4 by 4, will hold about 200 seeds if packed as follows: place a layer of earth and charcoal about $\frac{3}{4}$ inch deep on the bottom of the tin box, and lay the seeds in rows, leaving a little space between each. Spread another layer of the charcoal and earth, then another layer of rows of seeds, and so on until the box is full. Packing a slip of material across when the lid fits will help to keep the moisture in. When wetting the charcoal and earth it is a wise precaution to do it twelve hours before being wanted, as this gives the water time to permeate the whole mass evenly.

FEATHERS AS MANURE.

In a leaflet (No. 175) issued by the Board of Agriculture, on the 'Use of waste Organic Substances as Manures,' the following reference is made to the composition of feathers and their use for manurial purposes:—

Excellent results are obtained in some hop gardens by using about 20 to 25 cwt. of feathers, and the limited supply (amounting probably to only a few hundred tons a year) is rather keenly sought after. Large feathers are slow in action, the shafts especially taking a long time to decay; a sample containing many of them is not as valuable as one composed mainly of small, more easily decomposable feathers. The ammonia obtained is usually a little over 10 per cent., a not uncommon price being £5 per ton delivered, giving a unit price of 10s. In spite of the generally good mechanical condition, this price is, perhaps, too high. The price naturally fluctuates; farmers have been known to pay £5 15s., while samples have also recently been offered at 70s. to 86s. At these lower prices, where the unit value is 7s. to 8s., feathers must be considered cheap.



GLEANINGS.

Friday, November 9 (His Majesty's birthday) will be observed in Barbados as Arbor Day. Suitable plants can be obtained on application to Mr. J. R. Bovell, who will furnish information as to the manner in which they should be planted.

Writing to the Imperial Commissioner of Agriculture, the Commissioner of the Turks and Caicos Islands says: 'Salt raking has become general, and more has been gathered in Grand Turk since July 1 than in the previous thirty months.'

The St. Lucia Agricultural Society is desirous of obtaining three young he-goats, the progeny of 'Bruce.' Any one having such animals for sale is invited to communicate full particulars, in writing, to the Head Office, Imperial Department of Agriculture, Barbados.

The manufacture of lime juice in Jamaica is capable of great expansion; hardly any place in the world is so well adapted as this for the growth and manufacture of this product. The value of the exports of lime juice in 1904-5 was £3,897. (*Annual Colonial Report.*)

Coffee and rubber represent some 60 to 80 per cent. of the export returns of 1904 and 1905, and are the staple articles of Brazilian exports. Three kinds of rubber are exported, viz., Mangabeira (*Hancornia speciosa*), Maniçoba or Ceara (*Manihot Glaziovii*), and Seringa or Para (*Hevea brasiliensis*).

Among samples of gums examined at the Indian Museum during the year 1905-6 was one obtained from the jack-fruit (*Artocarpus integrifolia*). This gum is very resinous; the sample contained only 7.7 per cent. of caoutchouc and 90.3 per cent. of resins.

In order to popularize the banana, costers' parades are organized by Messrs. Elders & Fyffes, Ltd., in England. An illustration in the *West India Committee Circular* depicts the prize winners at such a gathering; prizes are awarded for general cleanliness and decorative effect.

Next to sugar, tobacco is the most important plantation industry in Java. The area planted is 15,046 acres, and the value of the exports last year was £2,279,661. The tobacco of Java is not equal in quality to the Sumatra leaf, the choicest of which, for cigar wrappers, has been sold up to 5s. 10d. per lb.

The Consul-General of Panama reports that the republic has contracted with Dr. D. H. Lupi, a well-known Venezuelan agriculturist, to establish a school of agriculture in Panama. Before opening the school, Dr. Lupi will travel throughout the republic and report his agricultural investigations to the Government. (*U. S. Monthly Consular Reports.*)

The United States Consul at Belize reports that there is a likelihood of a considerable expansion in the timber trade of British Honduras. Hitherto, there has been little opportunity for shipping mahogany and cedar to the United States. A new line of steamers has started to run direct to New Orleans from Belize.

In a review of the movement being made by German manufacturers of cotton goods, with assistance from the Government, in growing cotton in the colonies of the empire, the United States Consul at Zittan states that cotton cultivation in Togo has developed in normal proportions. In addition to 20,200 lb. of Togo seed, there were distributed 131,300 lb. of Egyptian seed.

The London *Evening News* states that the eruption of Vesuvius has spoiled the lemon crop in the Naples district, with the result that prices at Covent Garden for boxes of 420 have advanced from 30s. to 50s. It is pointed out that fruit dealers have an excellent substitute in the West Indian lime, which is claimed to be infinitely superior. 'A box of 220 is obtainable in London for 7s. or 7s. 6d.'

Tea to the value of £60 was exported from Jamaica during the year 1904-5. The tea plantation in St. Ann, belonging to the Hon. the Custos, has proved successful, and as long as the colony charges an import duty of 1s. per lb. and imports nearly 60,000 lb. a year from abroad, the local market must be so good as almost to preclude exportation. (*Annual Colonial Report.*)

According to the United States Consul-General at Frankfurt, the total European production of honey is estimated to amount to 80,000 tons, at an approximate value of ten to eleven millions of dollars. Germany leads in the production of honey among European countries with 1,910,000 bee-hives, furnishing 20,000 tons of honey. 'The news from America that special institutions have recently been established in the United States to raise queen bees for sale will be of interest to bee keepers.'

In his report on the Essequibo and Pomeroon Rivers district of British Guiana for 1905-6, the Commissioner mentions that 'tobacco, said by experts to be superior to that grown on the coast lands, can also be grown, and a considerable quantity is grown and cured by the Brazilians on the Takutu and taken by them to Boa Vista and Manaos, where it commands a ready sale at remunerative prices. The tobacco is cured and put up in a very primitive way, and, no doubt, if modern methods were used, it would be still more appreciated.'

An interesting experiment in connexion with agricultural instruction was recently made in the United States. This took the form of a special train, which consisted, according to the *Experiment Station Record*, 'of four cars, which were equipped with apparatus and exhibits illustrative of farm crops, fertilizers, animal husbandry, dairying, horticulture, entomology, and forestry. Forty-minute stops were made at stations along the route, the first twenty minutes being devoted to two terse ten-minute talks in each car, followed by twenty minutes for viewing the exhibits and asking questions. The undertaking was pronounced a great success from start to finish. It is estimated that about 25,000 people visited the train during its course.'



ST. VINCENT: ANNUAL REPORTS ON THE BOTANIC STATION, AGRICULTURAL SCHOOL, AND LAND SETTLEMENT SCHEME, 1905-6.

Botanic Station.—Several minor improvements were effected in the gardens, the general condition of which is reported to be satisfactory. A number of interesting plants have been added to the collection.

The smaller demand for cacao plants has caused a considerable decrease in the number of economic plants distributed from the nurseries. In all, 17,543 economic plants, besides 4,172 miscellaneous plants and quantities of vegetable seeds were distributed. There is apparently an increased demand for nutmeg plants. Three new nurseries, in addition to those already existing at the Botanic Station and the Georgetown Experiment Station, were established: two on the Land Settlement estates and one at the Agricultural School.

The meteorological returns show a steady diminution in the rainfall during the past six years. The rainfall for the year under review was 90·04 inches. This is about 15 inches below the average of the previous five years.

The report contains a summary of the results obtained in connexion with the cotton industry.

Agricultural School.—There are now twenty-five boys on the school books. It is satisfactory to note that the discipline in the school is better, while the health of the boys appears to have improved.

Two examinations were conducted during the year by means of papers set at this office. The results were, on the whole, satisfactory.

As much as possible of the work in the experiment plots is performed by the boys. Provisions were grown as usual for dietary purposes. Experiments were also carried out with fodder and other crops.

The stock kept at the school during the whole or part of the year included a Hereford bull, a Poland-China boar, a Toggenburg goat, and poultry of various breeds.

Land Settlement Scheme.—On March 31 last, 583 allotments were occupied. Attention has been paid to maintaining and extending the system of wind-breaks on these estates. A general improvement in the appearance of these lines is reported, and most of them are now fulfilling their purpose of protecting the cultivations. The total amount expended on these wind-breaks during the year was £58 5s. 8d.

Economic plants, mostly cacao, nutmeg, and coffee, have been supplied to the allottees. The total number distributed was 11,770; of these 9,895 were cacao, 1,406 nutmeg, and 385 coffee plants.

Manures were distributed to allottees at a total cost of £106 14s. 7d.

The general idea obtained by a careful perusal of Mr. Osment's report is that there is considerable improvement in the appearance of the allotments and that the holders are devoting more attention to their cultivations.

Appended to this report is an extract from the report of the Inspector of Schools containing observations on the progress of elementary agricultural instruction in St. Vincent.

FODDER PLANTS IN DOMINICA.

Careful experiments have been conducted at the Dominica Agricultural School to ascertain the value of improved Bascom Guinea corn as a fodder crop. For this purpose a plot of land was chosen and divided into four equal parts, each being $\frac{1}{10}$ acre in extent. The following fodders were then grown in these plots, each receiving the same treatment: Plot 1, Bascom Guinea corn; plot 2, improved Bascom Guinea corn; plot 3, Jerusalem corn; plot 4, Guinea grass.

Mr. A. J. Brooks has forwarded the following brief report on the results:—

Bascom Guinea Corn.—In this particular trial this plant gave the best yield of green fodder, the plants growing to an average height of 6 feet, and each plant being well furnished with good broad leaves from its base to its apex. The grain was, however, inferior to that of the Jerusalem corn.

Improved Bascom Guinea Corn.—This variety, whilst attaining to an average height of 10 feet, did not give such a good yield of green fodder as the former, but gave the greatest yield of dry fodder of the four plants tried. The internodes were much longer, and the lower leaves withered up before the top ones had developed, thus leaving about 4 feet of the lower portion of the stem bare. In this case no grain was obtained, the flowers remaining unfertilized.

Jerusalem Corn.—This plant grew to an average height of 5 feet; the individual plants, being slender and somewhat frail, gave a yield of only 12 tons of green fodder to the acre; the grain was, however, much superior to that of the two former crops, being very full and white. This plant should be grown in preference to the foregoing when grain is desired. It can be strongly recommended for very dry situations.

Guinea Grass.—The object of including a plot of Guinea grass in these experiments was to provide a sort of standard with which to compare the other crops. It is common knowledge that this grass under good cultivation will give four crops per annum of 20 tons per acre. As in this trial this crop gave a yield of only 15 tons per acre, it is only reasonable to assume that the average yield would be greater in each case.

YIELDS OF FORAGE PLANTS.

Name of plant.	Weight of actual yield.		Yield per acre.	
	Wet.	Dry.	Wet.	Dry.
	lb.	lb.	Tons.	Tons.
Bascom Guinea corn ...	1,715	938	30·6	16·75
" " " improved	1,640	1,050	29·2	18·75
Jerusalem corn ...	685	308	12·2	5·05
Guinea grass ...	874	423	15·8	7·55

Note.—‘Cattle should not be allowed to feed on young green sorghum, as it contains prussic acid.’ (*Agricultural News*, Vol. I, p. 70.) If cut when the grain begins to form and allowed to quail for a day before using, no evil results from such feeding.

Bascom Guinea corn is a valuable forage plant, especially for dry situations. Improved Bascom Guinea corn, on account of its height, is suitable for sheltered situations only.

Jerusalem corn is one of the surest fodder crops for dry situations; it produces a crop when other plants perish from drought.

CASTILLOA RUBBER CULTURE.

The *Tropical Agriculturist* contains an article, reprinted from the *Mexican Investor*, by Dr. P. Olsson-Seffer, entitled 'The Truth about Rubber Culture.' The editor of the former publication states that the author has had much experience in rubber culture and that his report may therefore be taken as authoritative.

Dr. Olsson-Seffer deals with the whole subject from the point of view of the investor. The following extracts will serve to give a general idea of the position of the *Castilloa* rubber industry:—

Rubber planting is now done on a large scale in Southern Mexico, and this is at present the principal rubber culture country in the world. The cultivation is here confined to the native tree *Castilloa*.

It is by no means a mere assumption that the cultivation of rubber may prove a success. It has been fully demonstrated that the *Castilloa* tree can be grown profitably on a commercial scale; that it produces under cultivation a sufficient quantity of rubber more than amply to repay expenses; and that plantation rubber can be produced cheaper and better than the product from wild trees. Although none of the Mexican plantations are, as yet, in full bearing, we could enumerate several plantations where tapping is now regularly carried on, and where the returns show that rubber planting is no more an experiment than the growing of oranges. In each case we have to presuppose the existence of right conditions.

Lack of experience has, in most cases, led to over-sanguine expectations in regard to the yield of rubber from a plantation. Usually, a few picked trees are tapped for the benefit of the inspecting shareholder, and from the results a total yield is estimated by means of a simple arithmetical calculation. The experience of the results of tapping is yet limited; but from actual tests, we know the following averages are certain:—

A plantation of seven-year-old trees will give 2 oz. to the tree; eight-year-old trees, 4 oz.; nine-year-old trees, 6 oz.; ten-year-old trees, 7 oz.; eleven-year-old trees, 8 oz.; and twelve-year-old trees, 10 oz. It is possible that a larger return will be obtained; but, so far, we have no reliable evidence to show that such would be the case.

It is satisfactory to those interested in rubber culture to know that the planters have generally recognized the importance of the immediate establishment of a rubber experiment station and laboratory in Southern Mexico.

The methods of gathering and handling the yield are still practically on the same level as they have been since the Indian 'ulero' began to roam through the forests in quest of rubber from the wild trees.

Experiments conducted by the writer during a three-months' stay in Southern Mexico last summer have made it evident that, by improvements in the methods of preparing crude rubber, large sums can be saved. But it also became clear that whatever experiments are commenced they must be done on the spot where fresh material is always at hand.

Matters that are now puzzling the rubber planters would be taken up and studied by the scientific experts, and the knowledge acquired would be of inestimable benefit to the planters. Such problems as the quality of soil best adapted to rubber culture, methods of planting, amount of shade necessary, care of the plants while growing, best mode of tapping, preservation of the trees after the tapping operation, transportation of latex, coagulation methods, and a variety of other questions, which are of the greatest practical importance, would be taken up.

These problems require immediate attention because the time is very near when wholesale tapping is to be commenced, and it means a considerable loss to the planters if these questions are not solved before that time.

To handle the immense amount of latex which is produced, say, from several million trees on a single plantation, it is necessary to introduce machinery, and for extracting and preparing the rubber on a large scale many different devices have to be worked out.

It is evident that the better quality of rubber a plantation can place on the market the higher will be the price obtained. The more rubber extracted from the milk, the greater the profit. At present a considerable percentage of rubber is lost in the coagulation process, and, where simply drying of the milk is employed, the product is of inferior quality and commands only a low price.

CASTILLOA RUBBER IN MONTSERRAT.

The Curator of the Botanic Station has addressed the following letter to the editor of the *Montserrat Herald*:—

In a short time, I hope to have at least 2,000 *Castilloa* rubber plants for distribution, and I am authorized to supply, free of charge, 100 each to responsible persons desirous of giving them a trial. Above that number, they will be charged for at the rate of 3s. per 100.

As you know, a few plants have been put out in recent years, some of which are doing well, particularly those at Harris' Station. I consider that there are many sheltered spots in the island where the tree would thrive, especially where the soil is stiff rather than of a sandy nature, as it would seem that the young trees cannot stand prolonged drought. At least as much care should be given, in the preparation of the hole for planting, as in the case of cacao or other plants, and if any decaying vegetable matter is available, this should be put in with the soil at planting.

In Dominica and other islands it is found that the trees are benefited by having a little shade, e.g., pigeon peas, for a year or two, after which they grow best open to the sun.

Suitable localities, I may mention, would be Harris' district, Gage's, Waterwork's, Nine-turn Gut, White's, and sheltered spots on St. George's Hill.

A number of plants will be ready to go out as soon as the rains come, and an attempt should be made to have the plant established before the dry season.

RICE GROWING IN BRITISH GUIANA.

In his report on the Essequibo and Pomeroon Rivers district of British Guiana for 1905-6, the Commissioner makes the following reference to rice growing:—

Rice cultivation seems, in many instances, to be taking the place of plantains on the lower parts of the river. There is an advantage which the cultivation of rice has over that of plantains, and which, I think, is being recognized. Excepting under abnormal conditions of weather, and with ordinary precautions, there is every prospect that the cultivator will reap the full crop of rice he may have planted. This is not so with plantains; for despite every care, he is certain to lose a considerable percentage from theft.

It may not be generally known that on the savannah of the Wakapoa Creek, a tributary of the Pomeroon, a wild rice is growing.

RUBBER IN SEYCHELLES.

The *Annual Report* of the Curator of the Botanic Station for 1905 contains the following account of the progress that is being made in Seychelles in connexion with the planting of Para rubber:—

Four years have elapsed since this plant was recommended as being the most suitable to the soil, climate, and labour conditions of this colony. The Government has gone to heavy expense for the introduction of seeds, and the last consignment, which was received during the year (50,000 seeds), was immediately purchased by ten planters at the price of 4c. a seed. A planter had on his own account introduced also 5,000 seeds. In both cases about 25 per cent. of the seeds germinated, and the rubber seedlings at present planted out in Seychelles amount to over 30,000 plants of from one to three years of age. The seedlings that were first planted out in November and December 1903 have made steady and excellent growth, the best of them having reached 1 foot girth and over at the base. The planters nearly all admit now that this plant grows well; and it is a pity that they did not come to this conclusion at an earlier date, as they were recommended to do, because the rush of rubber planting in Ceylon since 1904 will probably lead to greater difficulties in obtaining seeds from that colony.

The soil and climate of Seychelles are evidently favourable to the growth of Para rubber, which thrives even in laterite soils, where no other plants are at present growing. The best plants are those which were planted in the so-called marshes of Seychelles, which are merely deep alluvial soils, being formed of the surface soil washed down from the pools and accumulated on the plateaux. These alluvial soils are not sour and they are easily drainable; they are better adapted to Para rubber than to cocoa-nuts, because they are more or less submerged on account of the planters not being, as a rule, in a position to have them drained properly. When cocoa-nuts are planted in the marshes, the seed-nuts are placed on the ground and the plants issued from them are not only insufficiently rooted, but the base of the stem not being under ground, becomes easily accessible to the beetles. It is pointed out elsewhere that at least 6,000 acres are available in Seychelles for rubber cultivation.

I am indebted to a planter for the following figures, drawn up by measuring 100 trees in his plantation:—

		Height.	Circumference.	
			At the base.	At 3 feet.
		Feet.	Inches.	Inches.
Best plants	...	30	14 $\frac{10}{16}$	6 $\frac{1}{2}$
Medium plants	...	22	10 $\frac{4}{16}$	4
Smallest plants	...	15	6 $\frac{1}{2}$	3

On another estate a few plants were, in December 1903, planted out in the jungle without any clearing or holing. They were visited only after three years, and some of them found to measure 7 inches at the base. On Crown land, Capucin, 1,200 feet altitude, stumps one year old were planted in September 1904. After fifteen months' growth, they measured 6 to 10 inches circumference at the base and 16 to 20 feet in height. These figures go to show that the whole of the islands, from the summits to the seashore, are suitable for Para rubber planting. The sea-breeze does not check its growth in the least, the best tree at Praslin being planted at 20 yards from the beach.

CITRONELLA AND LEMON GRASS.

The *Annual Colonial Report* on Ceylon for 1905 contains the following reference to the citronella oil industry:—

The output of citronella oil (1,242,800 lb.) has improved 80,000 lb., the price having risen from 75c. to 84c. per lb. The cultivation of lemon grass for oil has been proceeded with at the Peradeniya Experiment Station, with fairly favourable results, and as the price of this oil is rising, its cultivation may prove profitable.

The subject of citronella and lemon grass in Ceylon, more especially in connexion with the cultivation of the latter as a catch crop in rubber plantations, is dealt with in the August issue of the *Tropical Agriculturist* by Mr. Ivor Etherington. The following summary may be of interest:—

During the last three years, the export of Ceylon citronella oil has gradually increased in quantity. Planters in the Malay Peninsula are turning their attention to lemon grass as a suitable catch crop for rubber plantations, and Ceylon planters are making experiments in the same direction.

It is useful as a catch crop, as it gives the first harvest after six months, being propagated from cuttings. It has been found at Peradeniya that the lateral root system of *Hevea* rubber spreads 1 foot each year on the average; that is, a circle 2 feet in diameter round the tree is occupied the second year, one 3 feet in diameter the third year, and so on; so that in rubber planted 10 by 10 feet, the root systems meet and occupy the ground in five years. Lemon grass can be grown down the rows between lines of rubber trees without interfering with the rubber roots, and as the plant dies down in three years, and has then to be freshly propagated for further growing and extensions, it is very suitable as an early catch crop in the plantation.

Lemon grass cultivation is spreading in Ceylon and Malay.

In a very interesting report on plantation industries in the Federated Malay States and Java, the Hon. Staniforth Smith, of the Australian Parliament, makes the following reference to the cultivation of citronella grass:—

From citronella grass (*Andropogon nardus*) a valuable scented oil is obtained that is used in the manufacture of superior soaps and other articles. In Java there are several large plantations—one of those I inspected being nearly 1,000 acres in extent.

The grass, if planted in good fertile soil, and enjoying a heavy rainfall, grows very quickly. From 10 acres a yield of 12 tons should be cut, and four crops a year can be taken off, totalling 48 tons. This will yield about 1/2 per cent. of oil, or 4 1/2 cwt., worth 3s. 10d. a kilogramme, say £46 16s. The grass lasts twelve years before it is necessary to plant again. To obtain the oil from the grass by distillation a small plant is required, consisting of one boiler costing £250, and a tank and condenser with pipe connexion, costing £85. A round tank, 16 feet in diameter, would be sufficiently large to treat four crops a year off 200 acres, if worked day and night.

While I would not recommend this as a principal crop in Papua, I think it should be cultivated, as in Java, as a catch crop between the rubber or cocoa-nut trees. The profits from this crop would be sufficient to pay the cost of maintaining a young rubber or cocoa-nut plantation until the trees began to bear.

MARKET REPORTS.

London,—September 25, 1906. Messrs. KEARTON, PIPER & Co.; Messrs. E. A. DE PASS & Co. September 21, 'THE WEST INDIA COMMITTEE CIRCULAR,' September 26, 'THE LIVERPOOL COTTON ASSOCIATION WEEKLY CIRCULAR,' September 21, and 'THE PUBLIC LEDGER,' September 8, 1906.

ALOES—Barbados, 15/- to 60/-; Curaçoa, 18/- to 55/- per cwt.
ARROWROOT—St. Vincent, 2½d. to 2½d. per lb.
BALATA—Sheet, 1/5 to 2/-; block, 1/5 to 1/5½ per lb.
BEES'-WAX—£7 12s. 6d. to £7 17s. 6d. per cwt.
CACAO—Trinidad, 68/- to 73/- per cwt.; Grenada, 60/- to 66/- per cwt.

CARDAMOMS—Mysore, 7½d. to 3/- per lb.

COFFEE—Jamaica, good ordinary, 40/- to 42/- per cwt.

COTTON—Medium fine, 6'10d.; West Indian Sea Island, medium fine, 13d.; fine 14d.; extra fine, 15½d. per lb. Prices paid 6½d. to 15d. St. Kitt's, 11d. to 12½d.; Antigua, 14d. to 15d.; Nevis, 10d. to 13d.; Carriacou, 10d. to 14½d., and Montserrat, 14½d. per lb.

FRUIT—

GRAPE FRUIT—8/- to 10/- per box.

BANANAS—Jamaica, 4/6 to 6/- per bunch.

LIMES—5/6 to 6/6 per box of 200, 21/- to 25/- per barrel.

ORANGES—8/6 to 12/- per box.

PINE-APPLES—St. Michael's, 2/6 to 6/- each.

FUSTIC—£4 to £4 10s. per ton.

GINGER—Jamaica, 59/- to 62/- per cwt.

HONEY—Darkish liquid to set, 17/- to 19/6; good liquid to fine white, 21/- to 28/- per cwt.

ISINGLASS—West Indian lump, 1/9 to 2/3; cake, 1/1 per lb.

KOLA NUTS—4d. to 6d. per lb.

LIME JUICE—Raw, 11d. to 1/2 per gallon; concentrated, £21 15s. per cask of 108 gallons; hand pressed, 2/3 per lb. Distilled Oil, 3/- to 3/3 per lb.

LOGWOOD—£4 to £4 15s.; roots, £3 10s. to £4 per ton.

MACE—Good palish, 1/6 to 1/9; fair red, 1/4 to 1/5; dark red, 1/8; broken, 1/- to 1/3 per lb.

NITRATE OF SODA—Agricultural, £11 15s. per ton.

NUTMEGS—64's, 1/5; 72's, 1/-; 82's, 10½d.; 93's, 8d.; 102's, 6½d.; 118's, 6d.; 130's, 5¼d.; 156's, 5½d. per lb.

PIMENTO—Fair, 2½d. to 3d. per lb.

RUM—Jamaica, 2/2; Demerara, 10½d. to 11d. per proof gallon.

SUGAR—Yellow crystals, 16/- to 17/- per cwt.; Muscovado, 14/- to 14/6 per cwt.; Molasses, 10/6 to 14/6 per cwt.

SULPHATE OF AMMONIA—£11 18s. 9d. to £12 per ton.

Montreal,—September 14, 1906.—Mr. J. RUSSELL MURRAY.
 (In bond quotations, c. & f.)

COCOA-NUTS—Jamaica, \$26.50 to \$28.50; Trinidad, \$25.00 to \$26.00 per M.

COFFEE—Jamaica, medium, 10c. to 11c. per lb.

GINGER—Jamaica, unbleached, 16c. per lb.

MOLASCUIT—Demerara, \$1.00 per 100 lb.

MOLASSES—Barbados, 26c. to 27c.; Antigua, 21c. per Imperial gallon.

NUTMEGS—Grenada, 110's, 18c. per lb.

PIMENTO—Jamaica, 6½c. per lb.

SUGAR—Grey crystals, 96°, \$2.50 per 100 lb.

—Muscovados, 89°, \$2.00 per 100 lb.

—Molasses, 89°, \$1.75 per 100 lb.

New York,—October 5, 1906.—Messrs. GILLESPIE BROS. & Co.

CACAO—Caracas, 15c. to 16c.; Grenada, 15c. to 16c.; Trinidad, 15c. to 16½c.; Jamaica, 13c. to 14½c. per lb.

COCOA-NUTS—Jamaica, \$30.00 to \$31.00; Trinidad, \$30.00 to \$31.00 per M.

COFFEE—Jamaica ordinary, 8½c. to 8½c.; good ordinary, 8½c. to 8½c. per lb.

GINGER—Dark scraggy root, 9c. to 10½c.; white to bright bold, 10½c. to 12½c. per lb.

GOAT SKINS—Jamaica, Antigua, and Barbados, 59c.; St. Kitt's, St. Thomas, and St. Croix, dry flint, 49c. to 51c.; dry salted, 36c. to 48c. per lb.

GRAPE FRUIT—Jamaica, \$4.00 per barrel; \$2.00 to \$3.00 per box.

LIMES—\$5.50 to \$6.50 per barrel; \$2.50 to \$3.00 per box.

MACE—30c. to 35c. per lb.

NUTMEGS—West Indian, 75's to 80's, 19c. to 20c.; 90's to 100's, 14½c. to 15c.; 110's, 12½c. to 13c.; 130's, 10c. to 11½c. per lb.

ORANGES—Jamaica, \$2.00 to \$2.50 per box; \$4.50 to \$5.00 per barrel.

PIMENTO—5½c. to 5½c. per lb.

SUGAR—Centrifugals, 96°, 4c.; Muscovados, 89°, 3½c. Molasses, 89°, 3¼c. per lb., duty paid.

INTER-COLONIAL MARKETS.

Barbados,—October 8, 1906.—Messrs. T. S. GARRA-WAY & Co., and Messrs. JAMES A. LYNCH & Co.

ARROWROOT—St. Vincent, \$4.10 to \$4.75 per 100 lb.

CACAO—\$12.00 to \$14.00 per 100 lb.

COCOA-NUTS—\$10.00 per M. for husked nuts.

COFFEE—\$10.50 to \$11.00 per 100 lb.

HAY—85c. to 90c. per 100 lb.

MANURES—Nitrate of soda, \$60.00; Ohlendorff's dissolved guano, \$55.00; Cotton manure, \$42.00; Cacao manure, \$42.00 to \$45.00; Sulphate of ammonia, \$75.00; Sulphate of potash, \$67.00 per ton.

ONIONS—Madeira, \$1.55 to \$3.00 per 100 lb.

POTATOS, ENGLISH—\$3.50 per barrel; Nova Scotia, \$3.42 to \$3.53 per 160 lb.

RICE—Ballam, \$5.75 to \$5.90 per bag (190 lb.); Patna, \$3.00 to \$3.50; Rangoon, \$2.70 to \$2.75 per 100 lb.

SUGAR—No quotations.

British Guiana,—October 13, 1906.—Messrs. WIETING & RICHTER.

ARROWROOT—St. Vincent, no quotations.

BALATA—Venezuela block, 25c.; Demerara sheet, 38c. per lb.

CACAO—Native, 12c. to 13c. per lb.

CASSAVA STARCH—\$5.00 per barrel.

COCOA-NUTS—\$10.00 to \$12.00 per M.

COFFEE—14c. to 14½c. per lb.

DHAL—\$4.70 per bag of 168 lb.

EDDOS—64c. to 84c. per barrel.

MOLASSES—16½c. per gallon.

ONIONS—Madeira, 2¼c. per lb.

PLANTAINS—20c. to 36c. per bunch.

POTATOS, ENGLISH—Nova Scotia, \$2.50 per barrel.

POTATOS, SWEET—Creole, \$1.20 to \$1.44; Barbados, \$1.20 to \$1.44 per bag.

RICE—Ballam, \$6.00 to \$6.25 per 177 lb.; Creole, \$5.35 per bag (ex store).

SPLIT PEAS—\$6.00 per bag (210 lb.).

TANNIAS—\$1.56 to \$1.68 per barrel.

YAMS—White, \$2.40; Buck, \$3.00 per bag.

SUGAR—Dark crystals, \$2.60 to \$2.65; Yellow, \$2.60 to \$2.70; White, \$3.60 to \$3.65; Molasses, \$1.50 to \$1.70 per 100 lb. (retail).

TIMBER—Greenheart, 32c. to 55c. per cubic foot.

WALLABA SHINGLES—\$3.00, \$3.75, and \$5.25 per M.

Trinidad,—October 13, 1906.—Messrs. GORDON, GRANT & Co.

CACAO—Ordinary to good red, \$15.25 to \$15.50; estates, \$16.25 per fanega (110 lb.); Venezuelan, \$15.00 per fanega.

COCOA-NUTS—\$21.00 per M., f.o.b.

COCOA-NUT OIL—73c. per Imperial gallon (cask included).

COPRA—\$3.65 to \$3.75 per 100 lb.

DHAL—\$4.65 to \$4.75 per 2-bushel bag.

ONIONS—\$1.80 to \$2.00 per 100 lb. (retail).

POTATOS, ENGLISH—\$1.25 to \$1.40 per 100 lb.

RICE—Yellow, \$6.25 to \$6.50; White, \$5.75 to \$6.25 per bag.

SPLIT PEAS—\$5.80 to \$6.00 per bag.

SUGAR—Grocery, \$2.25 to \$3.00 per 100 lb.



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Canada and the West Indies.

REFERENCE was made in the last issue of the *Agricultural News* to the successful exhibit of West Indian produce at the exhibitions recently held in Canada. The advisability of securing the adequate representation of the West

Indies at these exhibitions has been kept prominently before the readers of this journal. It was considered that this would be a means of still further extending the very considerable trade at present carried on between these islands and Canada.

Much interest has been taken throughout the West Indies in a meeting that was held at the Halifax Board of Trade Rooms on October 4, when the Imperial Commissioner of Agriculture addressed an influential gathering of Canadians interested in the development of trade with these islands, and drew attention to the desirability of encouraging closer commercial relations between the two countries.

Sir Daniel Morris referred to the excellent exhibit in the West Indian section at the Dominion exhibition, explaining that the products shown were all of a mercantile character and could be shipped from the West Indies in large or small quantities.

Years ago there was a large trade between Canada and the West Indies, but it had fallen off; recently, however, the business had increased to a wonderful extent.

Sir Daniel wished to dispel the impression that the West Indies were 'played out.' That such an idea was totally at variance with the facts was shown by the way the islands had taken up and developed the cotton industry. The West Indies were capable of producing a great variety of products, none of which were produced in Canada. There could, therefore, be no fear of the two countries becoming rivals, since each required what the other could produce. With wider markets an increase of trade might confidently be expected.

Canada takes about one-fourth, or nine million dollars worth, of the total exports of the West Indies, the principal articles being sugar, molasses, and rum, of which \$8,259,002 worth were imported into Canada last year. The importation of these products is increasing enormously. Canada also takes cacao, cocoa-nuts, fresh fruits, and hides in large quantities.

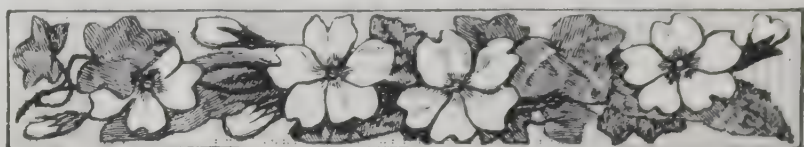
On the other hand, Canada's exports to the West Indies amount in value to nearly four million dollars, being chiefly bread-stuffs, fish and fish products, and other provisions. The trade in these products could be largely increased, especially if the requirements of these islands were more closely studied. Sir Daniel Morris instanced the flour trade, and suggested that the exporters should put up this product in the manner in which the people of the West Indies desired it.

In conclusion, Sir Daniel urged the adoption of more scientific methods in the promotion of trade, and suggested that a delegation of business men be sent next winter to the West Indies to meet representatives of the mercantile communities for a discussion, with a view to the mutual exchange of their several commodities. As stated in an editorial on this subject in the *Barbados Advocate*, of October 17, 'business relations are always promoted by personal acquaintance, and these delegates would be able to form a better idea of the value of the trade that could be done, and more easily perceive the obstacles that may be in the way of its development and the best means of removing them.'

In connexion with this subject of the improvement of trade relations between Canada and the West Indies, it may be of interest to refer to a recent report by the Canadian Commercial Agent in Trinidad (Mr. Edgar Tripp), published in the Monthly Report of the Department of Trade and Commerce of Canada, for June 1906. Mr. Tripp states that the exports of produce to Canada during the past three years were as follows: 1903-4, £31,829; 1904-5, £247,585; 1905-6, £219,029; the percentage of the total value of produce exported last year being 12.5.

Last year Canada took only 1,200 bags of Trinidad cacao, and Mr. Tripp asks: 'Should there not be an opening for a thoroughly up-to-date chocolate manufactory in the Dominion?' One thousand five hundred tons of asphalt were included in the year's shipments to British North America, but no manjak. There is also apparently no demand in Canada for balata.

In view of the large exports of molasses from the West Indies to Canada, interest is attached to the memorandum, published on this page, relative to the Canadian tariff in so far as it affects this article.



SUGAR INDUSTRY.

Molasses in Canada.

The following memorandum, dated September 15, 1906, from the Commissioner of Customs at Ottawa, contains the conditions under which muscovado molasses and 'fancy' molasses are at present allowed to be imported into the Dominion of Canada.

The Imperial Commissioner of Agriculture has been informed by the Minister and Commissioner of Customs that a revision of the tariff is likely to take place at the close of the current year, but that it is improbable that any change will be made in regard to muscovado molasses and 'fancy' molasses:—

Muscovado molasses and 'fancy' molasses, on importation into Canada, are tested by polariscope by Clerget's method.

At present all molasses (including 'fancy' molasses) testing not over 52° (Clerget) by polariscope, are admitted into Canada free of duty from British West Indies.

Genuine muscovado molasses is also admitted although testing over 52°.

'Fancy' molasses testing over 52° and not over 75° by polariscope is subject to duty at the rate of 40c. per 100 lb., less one-third rebate, under the Preferential Tariff, from British West Indies.

Varieties of Sugar-cane in Hawaii.

Bulletin No. 17 of the Division of Agriculture and Chemistry of the Hawaiian Sugar Planters' Association contains information respecting the sugar yields and the quality of the juices of the different varieties of sugar-cane under experiment. In addition, tabulated data, with reference to a number of recently introduced Demerara and Barbados seedlings, are given. The following table shows the yields of cane and of sugar per acre for the first six seedlings in the list:—

	Cane. Pounds per acre.	Saccharose. Per cent.	Sugar. Pounds per acre.
B. 156...	237,075	14.68	34,803
B. 244 ..	198,198	16.66	33,020
D. 1,135...	219,760	14.47	31,799
D. 1,483...	190,357	14.76	28,097
B. 306...	166,290	16.88	28,070
B. 208...	163,895	16.35	26,797

These seedlings show estimated yields far above all the other varieties tested, with the exception of the 'Dark Coloured Bamboo,' which gave 230,868 lb. of cane and 37,678 lb. of sugar per acre.

Experiments have also been conducted to obtain information 'concerning the relative check to growth which the various canes experienced during the winter season, and also the relative rapidity in which they reassumed a normal development with the advent of more favourable weather.' It is thought that the results should afford some indication of the relative value of the different varieties for planting in the lower temperatures of the higher altitudes.

Java.

Senator Staniforth Smith, of the Australian Parliament, recently visited the Federated Malay States and Java for the purpose of studying the methods of administration and economic development. He devoted particular attention to those plantation industries which were likely to be suitable to the territory of Papua.

In his report, to which reference was made in the last issue of the *Agricultural News* (p. 323), Mr. Smith deals with the sugar industry of Java as follows:—

As Java is one of the largest producing countries of cane sugar in the world, some particulars of the method and cost of production will be of interest to Australia, and may be of use in the future to Papua.

The whole of the sugar in Java is grown on irrigated land and on soil owned by the natives and not by the white people. The irrigated paddy, or rice fields, are the lands utilized for this purpose. The natives are allowed to rent to white people on short tenure not more than one-third of their land, so that the remainder may be used for growing rice (their staple food), or other crops, such as tapioca, indigo, etc. In the case of a communal village, where the lands are jointly held, the planter comes to terms with the villagers and rents one-third of the area for eighteen months; he also, if possible, gets them to agree to rent him another third the following year, and the remaining third the succeeding year. Having arranged with the village, the planter and the village headman go before a Government official, who records the agreement and sees that the money is paid over to the native for the first eighteen months' rental, and the deposit of perhaps 5s. an acre on the remainder of the land to be rented during the second and third years. The Government official generally seizes the opportunity for impounding the land, poll, and labour taxes on the natives for the year, as otherwise it is not always easy to obtain them. The natives, with that improvidence which is characteristic of the whole of the Malay race, generally squander the balance in a few days or weeks. The same process is gone through in the case of individual holdings. A sugar estate, with its own 'fabrik' or mill, generally has an area of from 1,200 to 1,500 acres. The plantation is by no means compact, but spread all through the paddy fields, an acre in one place, and 5 to 10 acres or more in another. In planting, the 'Reynoso' system is generally adopted (deep parallel furrows with high ridges between, on which the cane is planted) with the irrigation channels running across at right angles.

The total area under sugar-cane in Java is 233,520 acres, and there are 180 sugar mills, equal to 1,300 acres per mill; of these mills twenty are owned by Chinese, and 160 by Europeans.

After providing for the very large local consumption of sugar by 30,000,000 people, the balance is exported. Last year sugar to the value of over £7,000,000 was shipped. The manufactured sugar is classified by numbers from 12 to 18 according to purity. Nos. 12 to 14 are called 'muscovado' and contain 96½ per cent. of pure sugar. No. 18 is over 98 per cent. Not much sugar is refined to great purity in Java and goes into local consumption in that state, but a considerable amount is shipped to Hong Kong refineries. Apart from the fact that all sugar in Java is grown on irrigated land, there are other striking divergencies in the method of production in Australia and Java.

Instead of allowing the cane to grow up again after cutting, and thus make one planting do for several years, the

cane in Java is freshly planted every year and seldom on the same ground twice in succession, two crops of paddy usually intervening.

In Java the roots of the sugar-cane are crushed as well as the stem, a considerable amount of sugar being obtained from the former; this, I believe, is never done in Australia, and is a matter that might receive consideration when fresh planting is contemplated.

Though the price of sugar is not so high now as it was last year, planters are very confident that they can produce sugar profitably against any competition, whether from beet or cane, and a considerable amount of capital is being invested in the industry. Previously the molasses, after all the sugar possible had been extracted, was thrown away. The growers have now found a market for this product in British India, though the present price is only about 5s. 6d. a ton.

Trinidad.

The United States Consul in Trinidad has reported as follows on the position of the island's sugar industry:—

The recent introduction of labour-saving appliances, and particularly the steam plough, has resulted, on certain estates, in an increase of yield of 50 per cent. with respect to plant canes. It is no secret that Trinidad's prosperity depends, to a great extent, on the sugar industry. Cacao has sprung into and usurped the premier place among the products of the island, but sugar affords employment to far greater numbers than cacao, and the steadily increasing cane-farming industry is positive proof that the extinction of the sugar trade in the island would be a very serious setback indeed to the local economical situation.

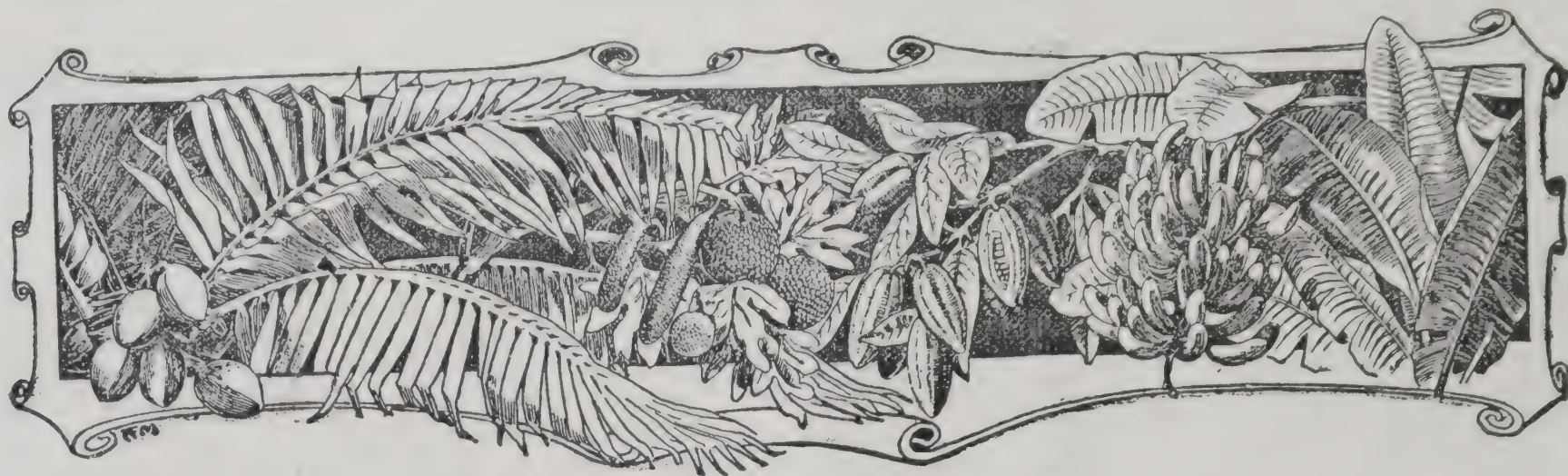
From time to time the planters have been urged to make use of the steam plough as applied in the larger estates of the north, thereby lessening the cost of production. The future of the industry absolutely depends on the cost being reduced to a minimum, and luckily this has been disclosed by the introduction of the steam plough and other labour-saving appliances wherever practical. The prevailing sugar prices in England this year have been so low that many of the estates will make no profit. However, with the increased use of the steam plough and more modern machinery, the cost of production will in the future be materially reduced.

Seedling Canes in St. Lucia.

In reference to the note in the *Agricultural News* (Vol. V, p. 248) on seedling sugar-caness in St. Lucia, where it was stated that their cultivation was being rapidly extended, the Agricultural Instructor in St. Lucia (Mr. George S. Hudson) reports further information. He estimates that a total area of 120 acres is occupied by these canes as follows:—

- B. 208—60 acres, principally at Cul-de-Sac, but a few acres are to be found on all large estates.
- B. 147—20 acres, well distributed all over the island.
- D. 115—30 acres, confined to lands of the Dennery Factory Company.
- D. 95 } 10 acres, distributed among the lands of the Rappoe } four factories.
- Total—120 acres.

The increase in this area has hitherto been limited by scarcity of plants. In the future it is likely to be considerably extended, as on both large and small estates not a single seedling plant is being wasted.



WEST INDIAN FRUIT.

FRUIT-CANNING INDUSTRY IN THE STRAITS SETTLEMENTS.

Reference was made in the *Agricultural News* (Vol. V, p. 178) to the fruit-canning industry of the Straits Settlements. The following note from the *U. S. Monthly Consular Reports*, for March last, is of interest:—

Consul-General Wilber says there is only one European canner at Singapore and he employs Chinese. All the rest are purely Chinese canners, with cheap Chinese labour and without power machinery. The cans are made by coolies in slack times, and so cost less than by machinery. The Chinese canners are practically controlled by European exporters. They advance the canners the tin plate and in return take the canned product. The canners work on small profits, and many of them have failed during the last two years. Prices vary much. Fresh pine-apples sell to canners for about \$2.50 gold per 100. The quality is irregular. There were exported from Singapore during the year 1904 to all countries 437,955 cases, valued at \$2,490,602, Straits currency; to the United States 55,124 cases, valued at \$327,929, Straits currency.

In the August issue of the same publication there appears a further report by Consul-General Wilber, in which he deals fully with the important pine-apple canning industry of the Straits Settlements as follows:—

The sixteen pine-apple canning factories at Singapore, all but one of which are owned by Chinamen, had an output of 548,330 cases in 1905, the value being \$2,788,269 in Straits currency (\$1 of which is worth 56 $\frac{7}{8}$ c. gold). This was an increase in production of \$297,667 over the previous year. Of the amount exported in 1905, 57,411 cases went to the United States and 294,792 cases to England. The most popular variety for canning purposes is called the Black Gamisca. The finest pine-apples grown in this part of the world are found in Sarawak, British North Borneo. A few come here for table use which are exceedingly large and have a delicious flavour.

The pine-apple yield in the vicinity of Singapore, where they are grown for canning purposes, will average about 4,000 lb. per acre after two years, about 4,000 plants being set out per acre. There is practically but one crop a year, and the middle of June is the height of the harvest. Some backward plants that do not come in bearing at this period will, in January, produce the 'small crop.' Canners pay from \$2 to \$5, Straits currency, per 100, according to size of

fruit and extent of the crop. The pine-apples grown on Singapore Island for canning purposes are small and medium in size, and quality varies greatly. As to whether the industry will increase or not depends on the demand. Chinese coolies are employed on all plantations, and receive from \$6 to \$8, Straits currency, per month, with food and quarters furnished. Food will cost about \$6 per month.

COCOA-NUT GROWING IN CUBA.

According to the official report of the United States Consular Agent A. F. Lindley, says the *Cuba Review*, 18,500,000 cocoa-nuts were exported from Baracoa during the year ended June 30, 1906. The fruit was shipped mostly to New York and Philadelphia.

In his researches for facts regarding cocoa-nut growing, Mr. Lindley elicited the following information:—

Cheap land, useless for other purposes, can be utilized. The tree needs plenty of water, and the nut increases materially in diameter during the rainy season. Sandy soil is good, and salt water does not hurt them. It is best to plant nuts already sprouting.

The best nut is the San Blas, brought from South America. It is a free huller, brings a better price in the States, and is free from disease. The nuts should be planted about 28 feet apart—about fifty-five trees to the acre.

The cocoa-nut tree begins to bear in about five years on the seashore, and in seven or eight years inland. Age does not count against the tree; in fact, some of the best trees here are over fifty years old. Each tree drops about sixty nuts a year, although one often hears the statement made that a tree gives a nut a day.

The nuts bring \$4 per 1,000 under 3 $\frac{7}{8}$ inches in diameter, and the same for sprouts and cracked nuts, while first-class ones run from \$10 to \$18 a thousand, delivered. A planter should get about \$6 a thousand as profit, or about 26c. a tree per year.

The lower-grade nuts, he says, can be used as food for hogs. They are very fattening, and the lard is very firm. Mr. Lindley also calls attention to the profitable oil possibilities of the unmarketable sizes. One thousand nuts will yield 30 gallons of oil by the hand process. It sells at 35c. per gallon, and, as showing what a home market there is at the colonists' door, he states that, of the 25,000 barrels of oil manufactured at Baracoa, all went to different parts of Cuba.

TOBAGO BOTANIC STATION.

The Tobago Botanic Station, of which Mr. H. Millen is in charge as Curator, is under the superintendence of Mr. J. H. Hart, F.L.S., of the Trinidad Botanical Department. Here nurseries are maintained for raising economic plants for distribution in the island. The following account of the station appears in Pamphlet No. 41, *Tobago, Hints to Settlers*:—

Situated quite near the town, with access from the bay, is the Botanic Station, where the intending settler may obtain information and instruction in tropical agriculture, and here, when the time comes, he will get the best varieties of young plants and seedlings for his estate.

The station (until March 31, 1906) was under the general direction of the Hon. Sir Daniel Morris, K.C.M.G., Imperial Commissioner of Agriculture for the West Indies, who has done so much to develop the agricultural resources of these islands. In his covering letter on the report of the

Curator for the past year (1904-5), the Commissioner writes:—

‘As I had an opportunity of paying official visits to the Tobago Botanic Station on May 24 and 26 last, I am in a position to confirm, by personal observation, the satisfactory condition of the garden, and the efficient work that is being carried on there in assisting the development of the agricultural interests of the island.

‘The garden is throughout in a high state of cultivation. It is conveniently situated so as to be accessible from all parts of the island, and its establishment and maintenance during the last six years by the Imperial Department of Agriculture have been greatly appreciated.’

The experiment plots at the station, and that established at Mr. Harry Smith's estate, Caledonia, serve as useful object-lessons, and should be carefully studied.

The Annual Report on the Tobago Botanic Station, for the year 1905-6, was reviewed in the *Agricultural News*, Vol. V, p. 271.

As indicating the useful work being carried on at this station, the following extract may be quoted:—

The Curator is again able to report a satisfactory extension in the plant distribution work, necessitating the enlargement of the nursery. The number of plants distributed from the station was the largest since the station was established, viz., 13,694—a very creditable increase of 4,159 over last year's total.

The rainfall at the Botanic Station during the year was 71.29 inches, which was well distributed.



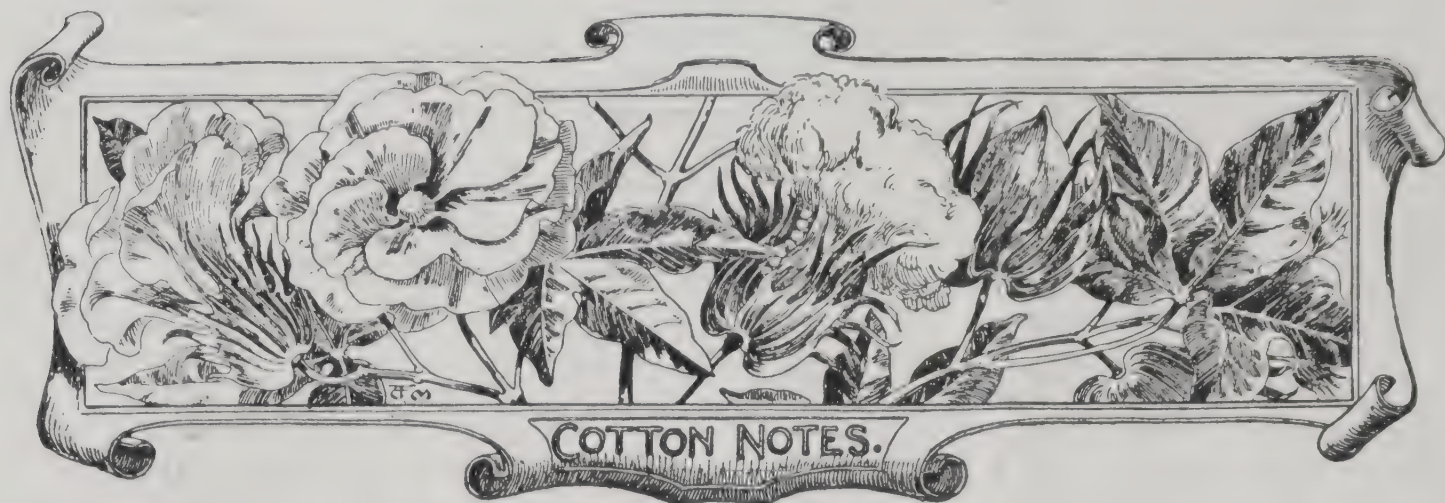
FIG. 23. VIEW IN BOTANIC STATION, TOBAGO. PLANT SHED AND NURSERIES.

DEPARTMENT NEWS.

The Imperial Commissioner of Agriculture addressed a meeting of the St. Kitt's Agricultural and Commercial Society on October 19. He arrived in Antigua from St. Kitt's by S. S. 'Korona' on October 25, leaving for Dominica on October 27. From Dominica, Sir Daniel Morris proceeded to Montserrat by the R. M. S. 'Eden' on October 31. It is expected that he will leave Montserrat to-morrow for St. Lucia, where he will remain till the arrival of the S. S. 'Ocamo,'

by which he will travel to St. Vincent and Barbados, arriving at the latter island on Friday, November 9.

Mr. Thomas Thornton, A.R.C.S., Travelling Inspector in connexion with Cotton Investigations in the West Indies, who, as previously mentioned in the *Agricultural News*, has been on a visit to St. Croix, arrived at Montserrat on October 27, where he will inspect cotton cultivations.



WEST INDIAN COTTON.

Messrs. Wolstenholme and Holland, of Liverpool, report as follows, under date of October 8, in regard to sales of West Indian cotton:—

Our last report was dated the 11th. ultimo, since which about 50 bales West Indian Sea Island have been sold, chiefly odd bales.

The American Sea Island cotton promises to be under 100,000 bales, as against 125,000 bales last season; we therefore hope to obtain fully as good prices during the ensuing year as in the previous one, provided always that the quality keeps up.

SEA ISLAND COTTON IN THE UNITED STATES.

The *Cotton Trade Journal* has the following review of the last Sea Island cotton crop in the United States, with a note on the prospects of the coming crop:—

This has been the record year in Sea Islands. When the season opened, the trade was estimating the crop as not exceeding 90,000 to 95,000 bags. After a few months it became evident that estimates would have to be increased, and in December the figures were raised to about 105,000 bags.

Prices at first had been satisfactory to sellers, but the larger estimates caused an easier tone and a dull market, which continued for some time. A result of this was that a good many growers in Georgia and Florida concluded to change their planting to the Upland variety.

As the season progressed, it was found necessary still further to increase the crop estimate, but, in the meantime, relief to the market came in the shape of an increased demand. This was due to the combined deficiency of the Egyptian crop and of the long-staple crop in the Mississippi district; consumers, who had formerly supplied themselves from those sources, were compelled to fall back upon the Sea Island.

Consequently, there was a sensible improvement in the market, in spite of the fact that the crop continued to prove larger and larger. So that, although the crop has ultimately turned out to be very nearly 125,000 bags, it has all been wanted.

With regard to the new crop, the acreage, as stated above, has been materially reduced in Georgia and Florida. In addition to this, the Sea Island cotton territory is located in that part of the eastern section which has suffered worst from excessive rain throughout the season. Complaints of damage have been numerous and continuous, and the outlook for the crop is poor.

Estimates formed thus early are, of course, subject to future revision, as was so clearly proved last year. At present, however, it may be said that the general estimate of the Sea Island crop of 1906-7 is for not over, say, 85,000 to 90,000 bags. The crop is from two to three weeks late, recent

rains having further retarded maturity and opening. Only a few bales of the new crop have as yet been received at Savannah. These have been of fine quality, but furnish no criterion as to the quality of the general crop, as the new bales come from new and highly fertilized lands.

DISTANCE FOR PLANTING COTTON.

The Annual Report on the Botanic Station and Economic Experiments in St. Kitt's for 1905-6 contains the following account of an experiment conducted to ascertain the most suitable distance for planting cotton:—

This was a further 'check' experiment upon distance planting, of which two instances were given last year, and it bears out their results. There is a slight anomaly in the 2 feet by 4 feet planting, but the general result of the experiments goes to show that the advice given in the Imperial Department's little manual, *The A.B.C. of Cotton Planting*, to plant 20 inches apart in the rows, is the best. It is noticeable, in every instance, that the outside plots have given a relatively larger yield than the inside. This may be due to the former receiving a larger amount of air and light, but the writer is inclined to think it may be due to the inside plots suffering more from pickers accidentally breaking off young bolls, when picking the mature ones; it shows again that the Department's advice, to make the distances between the banks 5 feet (in this experiment they were only 4 feet) is also sound.

The yields are given in the following table, but the plants were destroyed early in January, as they were attacked by the leaf-blister mite, and as sulphur and lime failed to stop the ravages, it was thought best to burn the cotton.

The Centreville cotton seems to be of a very variable quality. In most bolls from 5 to 8 per cent. of the fibres will usually be found nearly double the length of the rest, and whilst some bolls will contain beautifully silky cotton of good strength, in others it will be coarse and short without silky sheen:—

Plot (a) ...	4 feet × 3 feet.	28½ lb. of seed-cotton.		
„ (b) ...	4 feet × 2½ feet.	29½ lb.	„	„
„ (c) ...	4 feet × 2 feet.	27½ lb.	„	„
„ (d) ...	4 feet × 1½ feet.	35½ lb.	„	„

Total ... 121 lb. or 1,210 lb. per acre.

This is quite a remarkable yield, considering that the average, over nearly 1,000 acres of neighbouring land, has certainly been less than 200 lb. of seed-cotton per acre. It may be interesting and instructive to record that this cotton had no less than nine dustings with sulphur and lime for the leaf-blister mite, and three separate pickings of all infected leaves from the plants, but it was deemed best in the end to destroy the plants before any second blossoming had appeared.

COST OF GROWING COTTON IN ST. KITT'S.

A series of experiments was carried out with cotton at the La Guerite Experiment Station, St. Kitt's, during the year 1905-6. This series included trials of the effect of manures and of different varieties; efforts were also made to ascertain the best season for planting cotton and the most satisfactory distance at which it should be planted. These experiments covered an area of 5 acres.

In the Annual Report on the Botanic Station and Economic Experiments, for 1905-6, Mr. F. R. Shepherd gives the actual cost of growing cotton in these experiments as follows:—

	£.	s.	d.
Cost of banking land at 16s. per acre ...	4	0	0
„ „ seed „ 1s. 1d. „ ...	5	5	
„ „ planting „ 1s. 6d. „ ...	7	6	
„ „ supplying „ 6d. „ ...	2	6	
„ „ weeding „ 13s. „ ...	3	5	0
„ „ sulphur ...	4	0	
„ „ Paris green ...	1	1	0
„ „ lime ...	5	6	
„ „ applying insecticides ...	17	10	

Total cost to time of picking ... £10 8 9

„ „ picking and cleaning 5,002 lb. cotton at 1c. per lb. ...	10	9	5
„ „ ginning 1,352 lb. lint at 2½c. ...	7	0	10
„ „ shipping 1,352 lb. lint at 1½c. ...	4	4	6
„ „ 48 bags for stowing cotton at 16c. ...	1	12	0
„ „ manures for experiment ...	4	0	0

Total cost on 5 acres ... £37 14 6

Proceeds.—

807 lb. lint at 16 d. per lb. ...	58	16	0
213 „ „ 16½d. „ „ ...	14	11	10
176 „ „ 15½d. „ „ ...	11	7	4
156 „ „ 18 d. „ „ ...	11	14	0

1,342 lb. „ ...	£91	9	2
3,650 „ cotton seed at 1c. per lb. ...	7	12	1

Total proceeds from 5 acres ...	£99	1	3
Less expenses as above ...	37	14	6

Net profit ... £61 6 9

STRUCTURE OF THE COTTON FIBRE.

In an interesting paper by Mr. W. L. Balls, B.A., on the 'Sexuality of Cotton,' published in the *Yearbook of the Khedivial Agricultural Society, Cairo*, the following reference is made to the structure of the cotton fibre:—

The first point of interest is that the fibre begins to develop before fertilization is accomplished, but whether entirely independently of pollination or no, has not been definitely cleared up. The development of the fibre is not from sub-epidermal cells of the outer integument, as is usually stated, but by simple linear extension of the epidermal cells at a normal to the surface of the integument, the cotton fibre being thus a simple epidermal hair.

Moreover, the cells which develop into the fibres are entirely similar to all the others. It seems possible that the actual percentage of epidermal cells which give rise to hairs may be determined by external conditions and food supply as in the case of root-hairs, and that the work done on root-hairs, and hairs in general, may be applied to some problems of cotton formation, remembering, however, that the environmental conditions are far more uniform inside a cotton boll than in the soil or the air.

An epidermal cell of the outer integument has a very thick basal wall, thinner outer side walls, a thin cuticle covering the outer and dipping slightly between the side walls, with a nucleus which is about one-fifth of the length of the cell, and small vacuoles in the cytoplasm.

An examination into the behaviour of the nucleus, its disintegration, the mode and time of thickening of the cell wall and the other minor problems connected with the development of an individual fibre, is not sufficiently advanced to warrant publication. Enough has been said to show the inaccuracy of accepted statements wherever they have been tested, as far, at least, as the Egyptian cotton is concerned, and the necessity for further examination.

AGRICULTURE IN JAMAICA.

The Collector-General in Jamaica discusses, in his report for the year 1905-6, the returns as to the area devoted to agricultural purposes as follows, comparing acreages in 1905-6 with the average acreages for four years:—

There is an improvement in cane cultivation of 980 acres; in coffee of 542 acres; in bananas of 23,112 acres; in cacao of 1,600 acres; in ground provisions of 2,379 acres; and in minor items of 863 acres. The only item showing a falling off is the area in cocoa-nuts, where the drop is 1,328 acres. The increase in banana and cacao cultivation denotes very considerable agricultural activity in these products, and a complete recovery from the effects of the hurricane of 1903, the influence of which is still noticeable in the case of cocoa-nuts. Coffee, on account of better prospects, and canes, owing to the more equitable conditions governing the world's markets, help to swell the total increase in area of tilled lands of 28,477 acres.

The area in minor products is in turn classified under eleven separate sub-heads, the principal of which are: oranges 609 acres, showing an increase of 401 over a four years' average; cotton 480 acres, being an increase of 472 acres; rice 165 acres, an increase of 42 acres; and ginger 259 acres, an increase of 9 acres. Corn exhibits a trifling decrease of 9 acres, and tobacco 74 acres. Rubber makes its appearance for the first time, and registers 5 acres. If taxpayers in making ingivings are careful in noting different classes of cultivation, these compilations will become more interesting, useful, and reliable from year to year. Accuracy rests with the units of property owners, for, as I have explained, the Department can do little more than tabulate and present the information given.

The increased acreage in grass lands shows that, although there has been great activity in agriculture in the more limited sense of the term, the pastoral industry has not been neglected, and if the demand for cattle in the neighbouring republic of Cuba, which manifested itself during the year, is steadily developed on sound principles, continued increase may be looked for from year to year. A decrease in the area in wood and rinate follows naturally on the increase in cultural and pastoral lands.

EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming, should be addressed to the Commissioner, Imperial Department of Agriculture, Barbados.

All applications for copies of the 'Agricultural News' should be addressed to the Agents, and not to the Department.

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NOTES AND COMMENTS.

Contents of Present Issue.

The editorial in this issue draws attention to the desirability of encouraging closer commercial relations between Canada and the West Indies.

A further article on the sugar industry of Java appears on p. 339. This is followed by a note on the prospects of the industry in Trinidad.

On p. 340 will be found a short account of the fruit-canning industry of the Straits Settlements, where there are sixteen canneries with an output, in 1905, of 548,330 cases.

A view in the Botanic Station in Tobago is reproduced on p. 341. This shows the plant shed and nurseries, where 13,694 economic plants were raised for distribution last year.

Among notes of interest to cotton growers (see pp. 342-3) are notes on recent experiments in St. Kitt's. One deals with a trial of cotton planted at different distances, as a result of which a distance of 5 feet by 20 inches is recommended as likely to give the best results. Interest also attaches to the statement showing the cost of growing cotton in these experiments, which comprised an area of 5 acres.

A review of a recent publication on fungus diseases of the sugar-cane in Bengal appears on p. 347.

Notes on the cacao industry in the West Indies are published on p. 349. Very satisfactory progress is being made in St. Vincent; in St. Lucia, Castilloa rubber is being planted as a shade tree for cacao.

Industrial Enterprise in the West Indies.

Speaking at the half-yearly general meeting of the Colonial Bank on October 3 last, the chairman (Mr. Harry Dobree), after referring to the agricultural prospects of the West Indies, pointed out that there were signs of industrial enterprise springing up. The logwood factory in Jamaica had proved a distinct success, and another factory of the same kind was in operation, while a third was in course of establishment.

Mr. Dobree also referred to the possibilities of the fibre industry in which the banana stem might be utilized, as well as the refuse of the cane for paper making. There was, he said, possibly also a great future for the oil industry of Trinidad, as there was now no doubt that immense deposits of oil existed in that island.

Isolation of Stock in St. Vincent.

The St. Vincent *Government Gazette*, of October 25, contains an announcement, signed by the Government Veterinary Surgeon, to the effect that a suitable place has been set aside in Kingstown for the isolation, for fourteen days prior to exportation, of stock which it is desired to ship from the island.

At the expiration of that period, if the stock are well and healthy, the Government Veterinary Surgeon will give a certificate, which will be accepted in Barbados and Grenada, to which places such stock may now, under these conditions, be exported.

Owners of such isolated stock must supply fodder from such localities as may be approved by the Government Veterinary Surgeon.

These arrangements have been made to obviate the necessity of quarantining stock from St. Vincent in consequence of the occurrence in that island of anthrax.

Sugar-cane Experiments in Queensland.

The fifth Annual Report of the Director of Sugar Experiment Stations, Queensland, contains information respecting the working of the laboratories, the results of sugar-cane experiments at stations located in the sugar districts, and the introduction and trial of various economic plants for the year 1904-5.

Experiments with the ten best varieties have been started in quadruplicate on land selected for uniformity at the Central Station at Mackay.

These experiment plots receive the same cultivation, irrigation, and manuring, and have been commenced to ascertain what the best varieties will do in competition against one another. A West Indian seedling, Trinidad S. No. 60, is included in these ten varieties, and results, so far, indicate that it gives unfavourable returns with autumn planting or ratooning under Queensland conditions.

Experiments with different methods of planting, and with varieties of sugar-cane from different countries, have been continued to determine their relative values, and attention has been given to the raising of seedling sugar-canes.

St. Vincent Arrowroot.

The St. Vincent *Sentry* again draws attention to the necessity of combination among the producers of arrowroot with a view to regulating the shipment of this commodity. This matter was referred to in the *Agricultural News*, Vol. III, p. 345, where it was mentioned that, some three years previously, an agreement had been entered into to limit the output and demand a minimum price of 2*d.* per lb. in the English market. The result was that the price of arrowroot advanced very satisfactorily. On the expiration of the agreement, which was for one year only, the planters neglected to renew it.

The *Sentry* suggests a combination on the lines of the agreement entered into in 1901.

Events have proved that the buyers are always ready to pay more than 2*d.* per lb., whenever stocks are reduced, while St. Vincent arrowroot has been selling at 1½*d.* and 1¾*d.* per lb. till recently.

In spite of the bright prospects of the cotton industry, St. Vincent cannot afford to bear depression in the arrowroot market, as the greater portion of the cultivated lands is still in arrowroot cultivation. This is the principal industry of the island, its value being about £20,000 annually.

Rubber Planting in Jamaica.

There are encouraging signs that planters in Jamaica are turning their attention to the planting of rubber trees. A considerable number of rubber plants is being distributed every year from the Department of Public Gardens and Plantations, and large orders have been booked by the Department for next year's planting.

An interesting letter was communicated to the London *Daily Telegraph* recently by Mr. Robert Elworthy, of Linstead, in which the writer makes out a strong case for Jamaica as a promising field for rubber cultivation.

While some planters have trees of *Castilloa elastica* which are now ready for tapping, Mr. Elworthy states that he planted his trees six years ago, and that he expects to be able to start tapping in the course of the next two years. He says: 'The growth, where soil and shade conditions are favourable, is marvellous. A large number of my trees are well above 30 feet high, and are a yard in girth 2 feet from the ground. This girth measurement is increasing at the rate of at least 3 inches annually.'

Mr. Elworthy does not anticipate much trouble from hurricanes, as a *Castilloa* tree is scarcely likely to be uprooted, being very supple. The top might be blown off; but this might take the place of pollarding, and cause the trunk to develop a larger tapping area.

In reference to this letter, the *Jamaica Daily Telegraph* mentions that the Agricultural Society has recently appointed as an Agricultural Instructor a gentleman who has had considerable experience, both in Ceylon and in Central America, in connexion with rubber planting. His knowledge of tapping operations is likely to be of considerable service to rubber planters.

Cacao Land in St. Lucia.

The *Voice* of St. Lucia, of October 25, contains notes on a visit paid to a large cacao district which is being developed by the opening up of new land in the Grand Cul-de-Sac and Roseau Valleys.

There was a fair show of cacao at Deglos, Odsan, and l'Abbeys; some of it as good as possible, and some showing the effects of lack of drainage and forking.

The district comprising Sarrotte, Vanard, La Treille, and Millet contains 1,000 to 1,500 acres of good cacao land. To judge by the 400 to 500 acres in actual cultivation, the district should be capable of producing a crop of about 2,000 bags.

With the laying out of new roads, a large area of excellent cacao land could be brought into cultivation.

Exports of Jamaica.

According to the report of the Collector-General for the year ended March 31 last, there was an increase of £406,455 in the total value of the exports of Jamaica, as compared with the previous year.

Of this amount fruit accounts for 55 per cent.; minor products, 15.9 per cent.; coffee, 7.6 per cent.; sugar, 6.9 per cent.; rum, 5.6 per cent.; dyewoods, 4.5 per cent.; and pimento, 4.5 per cent.

Referring to the increase in the output of sugar, Mr. Miles states that the industry has shown considerable improvement since the abolition of the bounties. By the erection of better machinery and the closer attention to manufacture, the cost of production has been lessened. Appreciably higher prices were obtained for rum, and the future of the Jamaica rum industry is promising.

The fruit industry, of which the banana and the orange form the principal items, still retains its first place in the island's economics. It is suggested that the increasing demand for the banana and the failure of Jamaica to supply fruit of the best quality should point a lesson to those interested in the cultivation of this crop. In the orange industry there are great possibilities, provided the most intelligent methods of marketing are adopted.

The figures as to minor industries during the past three years show that a steady development is taking place. This is attributed, largely, to the work being carried on by the Agricultural Society. 'Capital is also being invested in the development of minor products. We have with us such promising ventures as the Starch Factory and the Preserve Factories. The manufacture of butter on a large scale has also been undertaken, and the tea industry in St. Ann is extending. The industry of dye extraction from our native dyewoods is also expanding. An extensive plant is now being laid down in St. Elizabeth in connexion with this industry.'

'The total exports of dyewoods for the last three years were: 1903-4, £117,262; 1904-5, £78,226; 1905-6, £80,286. There is a promising future for this product; the perfecting of the process of extracting locally the dyes from these woods has added materially to their value.'



INSECT NOTES.

Cotton Insects in Barbados.

The present season has been specially favourable for the insect pests of all kinds of crops in Barbados, and cotton, corn, potatoes, and green dressings have all suffered from attacks of caterpillars, or worms, in different parts of the island.

At the present time, the cotton worm is to be found in most sections of the island where cotton is being grown, and on certain estates is causing considerable damage to the growing crop.

A recent tour of inspection through a portion of the island, where large areas of cotton are now growing, revealed some significant facts as to the control of the cotton worm and the use of Paris green.

On one estate a field of cotton was badly attacked by the cotton worm. The gang was applying Paris green and lime mixed at the rate of 1 to 3, 16 lb. of the mixture being used for a single application per acre.

The dusting of this field had been left for at least four days after it should have been done, and the injury was very great. To make up for this neglect, about three times as much Paris green was being used as was necessary. The loss here was three-fold: (1) the injury to the cotton by the destruction of the leaves, (2) the waste of Paris green and lime, and (3) the worms were not being killed. This last was not the fault of the Paris green, but was due to the presence of such large quantities of the poison mixture that the caterpillars would not eat the leaves. Those that were nearly full-grown would, in this case, pupate, and while a few would not have the strength to complete their development, the remainder, pupating and providing for the production of large numbers of eggs, would cause the continued infestation of this and neighbouring cotton. The younger cotton worms will, for the most part, refuse to eat the cotton leaves so densely covered with Paris green and lime and will migrate from that field to the next, or, failing to find suitable food, will starve to death.

In the cotton fields in question, the poison mixture was being applied by means of bags. These were made of material much too coarse, so that, even with great care, it was difficult to avoid applying too liberal a covering to the plants.

As a contrast to this field of cotton, the cotton on another estate might be mentioned. In this instance, Paris green and lime were mixed at the rate of 1 to 7, and applied by means of (a) Champion powder guns, (b) Acme powder bellows, and (c) bags of fine cloth. The amount of Paris green used on this estate varies from $\frac{1}{2}$ lb. to a little over 1 lb. per acre for each application, and no damage is done to the cotton by the attacks of the cotton worm. Forty acres of cotton had been dusted with only 24 lb. of Paris green. This does not indicate that the cotton on the second estate was any less subject to these attacks, but shows, rather, that care and intelligent supervision had resulted in every attack being checked before it became serious, that is, while the worms were still young; and comparison of the amounts of material used shows that good results can be

obtained from the application of a small amount of Paris green, provided the application is thorough and the poison is evenly distributed.

Careful and constant inspection of cotton fields to detect the presence of the worm in its early stages of development, and the careful and economical use of Paris green, are matters that should receive the cotton planters' most earnest attention from the time the cotton begins to grow till the crop is harvested. Carelessness in these matters is almost sure to lead to severe loss to the planter.

Cotton Pests in Egypt.

The *Yearbook* of the Khedivial Agricultural Society of Egypt, for 1905, contains interesting papers on the insect pests of cotton in that country. These are:—

The cotton worm (*Prodenia littoralis*), the boll worm (*Earias insulana*), the cutworm (*Agrotis ypsilon*), and a leaf-eating insect, *Caradrina exigua*.

The cotton worm differs from the cotton worm of North and South America and the West Indies in several respects, and the methods in use for its control differ also. The Egyptian cotton worm moth deposits its eggs in clusters on the lower leaves of the cotton plant. These eggs are collected by children, this method of hand picking being considered the most practicable for that country.

The use of insecticides is not considered feasible on account of the large size of the Egyptian cotton plant.

Prodenia littoralis feeds on a variety of plants, and, while this fact may seem to render its control more difficult, the caterpillars may be attracted to one or another of these food plants and then destroyed.

The cotton boll worm attacks the boll after the manner of the North American boll worm (*Heliothis armigera*), and the corn ear worm (*Laphygma frugiperda*), which sometimes attacks cotton bolls in the West Indies. (See *Agricultural News*, Vol. IV, p. 202.)

Earias insulana also attacks the terminal shoots of the cotton and lives in winter on other malvaceous plants. Cultural methods, such as the removal of secondary food plants and the cutting out of infested shoots and bolls, are recommended for the control of this pest. (See *Agricultural News*, Vol. V, p. 106.)

Agrotis ypsilon is known as the cutworm of cotton and berseem. This insect is known in America and the West Indies, and is one of the cutworms that have attacked young cotton seedlings in the West Indies in the past few years.

The poisoned bait already recommended for use in these islands has been found to be successful in controlling the cutworm in Egypt.

Caradrina exigua feeds upon the leaves of cotton, and frequently the tender stems, and the soft part of the roots below ground are eaten also. This pest generally attacks the young cotton, and is controlled by hand picking, flooding, and the use of Paris green. Several species of this genus occur in the West Indies.

WEST INDIAN AGRICULTURAL CONFERENCE, 1907.

Brief mention was made in the *Agricultural News* (Vol. V, p. 316) that it was hoped to hold the next West Indian Agricultural Conference in Jamaica in the second week of January next. Steamer arrangements having now been satisfactorily settled, there is every prospect that it will be possible to carry out this proposal.

FUNGUS DISEASES OF SUGAR-CANE IN BENGAL.

The above is the title of a bulletin by Mr. E. J. Butler, M.B., F.L.S., forming the third number of the first volume of the botanical series of the Memoirs of the Department of Agriculture in India. It is intended to serve as a preliminary account of the principal fungus diseases that affect sugar-cane in Bengal, and will form a basis for further experimental research at the Agricultural Research Institute at Pusa.

Several of the diseases described are familiar to experimentalists with the sugar-cane in countries other than Bengal. Extracts from the work done on the fungus diseases of the sugar-cane at the laboratories at Kew and at the research stations in Java, Madras, and the West Indies are briefly summarized and compared with results of observations from 1902 in Bengal.

Several of the results obtained are of considerable interest, for they suggest the need of additional researches to establish fully some points of importance. Some points that need to be worked out are suggested by the author.

Of stem diseases, the 'red-rot' is considered to be the most serious disease with which sugar-cane growers in Bengal have to contend. The external appearance of the disease would at first suggest drought, but on splitting open a cane the tissues are found to show a reddish discoloration in one or a few of the lowest internodes, extending downwards into the stool and later proceeding upwards towards the top of the cane.*

This disease is held to be caused by the fungus *Colletotrichum falcatum*, Went, but the connexion between the presence of the fungus and a boring insect that is almost invariably present has not yet been established with certainty.

It would appear that yellow canes of the Bourbon type are particularly susceptible to its attack, for in 1902 some fields planted in a variety of this type for the first time with seed from a diseased area were badly attacked, while other varieties of canes were quite healthy. The following year this localization was the more marked.

Samples of diseased and healthy canes were taken for analysis. The results were most interesting. Diseased canes showed a diminution of 45 per cent. in the total available sugar and a marked increase in glucose. Subsequent experimental work suggests that the actual consumption of sugar by the fungus is slight compared with its inverting action.

The author is of opinion that this disease, which has also been reported from Madras, and from Java as the 'red smut,' is identical with the 'rind disease' of the West Indies except that it is very rarely followed by the *Melanconium* stage of *Trichosphaeria Sacchari*, Massee.

In dealing with the means that the fungus has of spreading, the conclusion is arrived at, provisionally, that the 'sets' themselves, in the majority of cases, carry the disease. Therefore, the most important considerations in regard to this disease are held to be (1) choice of resistant varieties and (2) careful selection of seed canes for planting.

Of the other stem diseases, 'smut,' caused by *Ustilago Sacchari*, Rabenhorst, is confined to certain varieties, and experiments to inquire into whether spore-infection of sound sets can be prevented by means of steeping them in copper sulphate are being continued.

* Other examples of 'red rot' show that the disease may appear in the nodes towards the middle of the cane, the roots, and also the leaves.

Melanconium form of *Trichosphaeria Sacchari*, *Diplodia cacaoicola*, P. Henn, and *Cytospora Sacchari*, Butl., sp. nov., have also been found attacking stems of sugar-cane, but are probably of only minor importance.

The 'pine-apple' disease of cuttings caused by *Thielaviopsis ethacetica*, Went, has been found on imported canes from Java and Mauritius. This clearly shows the necessity of careful examination of imported seed for signs of disease, and suggests that laws governing disinfection and importation should be passed by all countries.

A 'black-rot,' caused by *Sphaeronaema adiposum*, Butl., is described for the first time, but it seems that this fungus, like that causing the 'pine-apple' disease, causes only the failure of sets.

Leaf diseases are not striking in their effects, but it is thought that where they are prevalent they are responsible for considerable losses in the yield of sugar. A new species of *Cercospora* is described as the 'brown leaf-spot' and may be compared with the 'red-spot' which is common in the West Indies, and the 'eye-spot' of Java canes. Spreading of leaf diseases can, as a general rule, be checked by careful burning of all diseased leaves.

The author gives certain recommendations for treatment of the several diseases, but he is of opinion that the chief means of combating these diseases lies in the choosing of varieties less liable to attacks, or in the production of other resistant varieties by careful selection or hybridization.

RAINFALL IN ANTIGUA.

Mr. H. A. Tempany, B.Sc., has forwarded the following table showing the rainfall for the month of September on seventeen different stations in Antigua, which together represent fairly well the precipitation over the entire island. Mr. Tempany says:—

The mean rainfall for the month for all these stations is 18.48 inches.

The month has been phenomenally wet for this island; in fact, the rainfall is the greatest recorded in any one month as far back as the detailed records of the rainfall kept in this office extend, that is to say, for a period of eighteen years, and it is probable that in reality it is a record for a considerably longer period of time.

Station.				Rainfall for the month of September 1906.
				Inches.
Fitches Creek	...	...	...	22.56
Parham New Work	...	...	...	21.29
Claremont	...	...	...	20.95
Bellevue	...	...	...	20.28
Pare's	...	...	...	20.00
North Sound	...	...	...	19.51
Blubber Valley	...	...	...	19.37
Botanic Station	...	...	...	18.86
Orange Valley	...	...	...	18.38
Weatherill's	...	...	...	17.87
Cedar Valley	...	...	...	17.30
Bendal's	...	...	...	17.09
Walling's	...	...	...	16.93
Dimsdale	...	...	...	16.63
Cassada Garden	...	...	...	16.52
Thibou Jarvis	...	...	...	15.90
Montpelier	...	...	...	14.79
Mean of all stations—				18.48 inches.



GLEANINGS.

School shows will be held in Trinidad this month as follows: Scarborough (Tobago), November 7; Port-of-Spain, November 16; Arima, November 20; San Fernando, November 23, Princes' Town, November 30.

A total area of $41\frac{1}{4}$ acres has been planted in Sea Island cotton on the Land Settlement estates in St. Vincent. The Agricultural Instructor reports that the condition of the cultivations is, on the whole, promising.

Mr. Edgar Beckett, Agricultural Instructor in British Guiana, has reported that an excellent crop of ground nuts is being produced at La Bonne Mère plantation. Many of the soils around Mahaica and Mahaicony are suited to the cultivation of this crop.

The pure-bred Hereford bull, belonging to the St. Lucia Agricultural Society, is to be sold by auction on November 7. The upset price will be £15. The sale will be made subject to a written promise from the buyer that the animal will not be removed from the colony for three years from date of sale.

A plot of *Vanilla planifolia*, about $\frac{1}{10}$ acre in area, was formed at the Botanic Station in St. Vincent last year, plants of the physic nut (*Jatropha Curcas*) being used as supports for the vines. Vanilla appears to do well in the island, but at present only Mr. P. F. Huggins, of Bellewood, has attempted the cultivation. (Annual Report.)

Messrs. Pickford & Black, of Halifax, Nova Scotia, have written to the Imperial Commissioner of Agriculture as follows: 'After you left Halifax we had an inquiry for copra and cocoa-nut oil in 10- and 15-ton lots. Possibly you would be kind enough to ask some of the people who sell these goods to quote us prices, f.o.b. our steamers, and also to send us a small sample to show the quality of the articles.'

Mr. Thomas Thornton, A.R.C.S., Travelling Inspector in connexion with Cotton Investigations, gave a lecture on cotton growing in the Council's Hall, St. Croix, on October 3. After giving a short account of the origin of the British Cotton-growing Association, he discussed the principal points in regard to the cultivation of Sea Island cotton, which might, he stated, be profitably grown in St. Croix.

Messrs. Henry W. Frost & Co., of Charleston, report, under date of October 6, that the total receipts of 'Islands' cotton, so far this season, are only 73 bales. 'The factors have not sampled any cotton as yet, consequently there is absolutely nothing offering for sale. What the probable opening prices will be, it is difficult to say until the crop begins to move.'

With a view to encouraging the cultivation of cotton along the best lines by small growers in Nevis, Mr. J. O. Maloney, Junior Assistant to the Agricultural Superintendent in Barbados, has been temporarily appointed an Instructor in connexion with cotton cultivation. Mr. Maloney left Barbados for Nevis on October 27.

Not long ago Mr. G. C. Wyatt, agent of the British West India Fruit Company at Princes' Town, supplied Palmiste estate, the property of Mr. Norman Lamont, with 5,000 banana suckers. At the present time there are about 8,000 more at Mr. Wyatt's residence for the same estate, where it is intended to put 100 acres under banana cultivation. (Trinidad Mirror.)

The Collector-General in Jamaica reports that, although the coffee industry is overshadowed by the enormous production in Brazil, the high mountain coffee of Jamaica and the small settlers' productions are of sufficient value to ensure this product being reckoned as one of the island's staples. The value of the exports of this commodity during 1905-6 was £134,283, as against £85,173 in the previous year.

Professor Harrison has written to the Board of Agriculture in British Guiana, that the executive officers of the British Cotton-growing Association 'concur entirely in the view that there is, owing to climate and soil conditions, little or no hope of the successful cultivation of Sea Island and Egyptian cottons in British Guiana. They recognize the importance of continued experiments with the native varieties of cotton, with the view of improvement in the staple of the cotton.'

During the past few years a serious disease of lemons, known as the 'brown rot,' has caused considerable anxiety to lemon growers and shippers in Southern California. This disease has been under investigation by the California Agricultural Experiment Station, and has been found to be due to a fungus (*Pythiacystis citrophthora*, Sm. & Sm.). Infection takes place by swarm-spores both on the tree and in the washing tank, and the disease spreads very rapidly in damp, warm weather. (Botanical Gazette, Vol. XLII, p. 215.)

In his Annual Report on the Revenue and Customs Department in Jamaica for the year 1905-6, the Collector-General states: 'The total exports of pimento for the last three years were: 1903-4, £88,847; 1904-5, £136,969; 1905-6, £80,268. This is a product which is not affected by competition, Jamaica being practically the only place where the spice is produced. The fluctuations, therefore, are governed only by supply and demand.' Pimento was accountable last year for 4.5 per cent. of the total value of the exports of the colony.

In reference to the note on the Jamaica pimento market, in the *Agricultural News* (Vol. V, p. 201), it may be mentioned that, according to the *Jamaica Daily Telegraph*, a syndicate was 'formed to enable Jamaica producers to dictate the price of the spice, instead of leaving the question to the caprice of foreign speculators.' It is the opinion of that journal that 'pimento will always find a ready sale, provided the price does not exceed—at all events appreciably exceed—3d. per lb.; and the directors of the syndicate have no desire or intention to advance the price beyond that figure.'

CACAO AND RUBBER IN ST. LUCIA.

A report from the United States Consular Agent Davidson, at St. Lucia, on cacao and rubber in that island is as follows:—

Cacao is the next important product of St. Lucia after sugar. The output is steadily increasing and will soon surpass the latter. The quantity exported for the last twelve months was close on 800 tons, the largest cultivated variety being the Forastero, and the average local price is \$8 per 100 lb. Rubber is now being used as a shade for cacao, and it is generally believed to be beneficial in situations where there is much moisture. The Central American variety is that grown most largely. No exports of rubber have as yet been made, as the industry is in its infancy, but at the experiment station of the Imperial Department of Agriculture trees, which have already reached maturity, have been tapped, and the product has been favourably reported upon by experts in England. The rubber tree has not, in this island, been subject to attacks by insects, but in isolated instances, where the soil or position is not favourable, scale has appeared in the dry season, but this is easily eradicated; in fact, it rights itself again when the rain comes on.

CACAO INDUSTRY IN ST. VINCENT.

The Annual Report on the Botanic Station, Agricultural School, and Land Settlement Scheme in St. Vincent, which was reviewed in the last issue of the *Agricultural News* (p. 333), contains the following review of the position of the cacao industry in that island. Very encouraging progress has been made:—

In last year's report it was mentioned that the exports of cacao from the island showed a steady increase, and it was pointed out that in the year 1900 the exports of the cured product amounted to 443 bags, and had increased in 1904-5 to 742 bags. The steady increase has been maintained during the past year, and the exports amounted to 787 bags, of an estimated value of £2,423.

A large number of plants (14,047) were again distributed from the nurseries under the charge of the Department, which indicates that, although the price of cured cacao was low, the industry is a progressive one, notwithstanding the counter attractions of the cotton industry, an industry which gives much quicker returns.

Thrips were seen in most cultivations and did a considerable amount of damage on some estates, especially in the dry season. The dry soil and atmospheric conditions due to the lack of suitable permanent shade, or shade not well regulated, were thought to be responsible for the severe attacks, as trees suitably shaded suffered very little damage.

A number of plants of the 'Madura' shade trees (*Gliricidia maculata*) have been sent out from the Botanic Station to several cacao estates to assist planters in overcoming the difficulty. The 'Madura' grows exceedingly well in the island and is well suited for the purpose. It has not, so far, been attacked by scale insects, which constantly attack certain species of *Erythrina* (Immortels), also used for shading cacao in this island. On two estates plants of the Central American rubber tree (*Castilloa elastica*) have been planted out for shade and rubber purposes.

To improve the soil conditions of young cacao plantations, green dressings of woolly pyrol (*Phaseolus Mungo*) have been advocated, and several planters have taken up the advice. Besides the value of this plant for enriching the soil in nitrogen, it possesses the advantage of a thick bushy growth which quickly covers the ground.

CACAO IN BRITISH GUIANA.

The *U. S. Monthly Consular Reports*, for August, contain the following report on cacao cultivation in British Guiana:—

The area under cacao cultivation in British Guiana is estimated to be 1,500 acres, and the quantity exported annually varies between 50,000 lb. and 125,000 lb.

The difference between the production and the export is consumed locally. There are two factories manufacturing chocolate for local consumption. The Criollo, Forastero, and Calabacillo are cultivated. The Criollo is the best, but is not as hardy as the Forastero, which is the one usually grown here. The Calabacillo is inferior, the beans being flat and of a bitter taste. With favourable weather the average yearly production may be taken at 25,000 lb. per 100 acres, or, say, 1 lb. per tree, but this is exceeded by a few properties which have been intelligently planted and shaded and have been carefully looked after, and the production of such does not fall far short of 35,000 lb. per 100 acres. The price realized for home consumption is from \$11 to \$12 per 100 lb., but increased production would soon cause a drop and the foreign market rates counted on. There is no noticeable increase in the production, and the area under cultivation is not much greater than it was four or five years ago. Local men of means are not inclined to embark in cultivating a product that takes at least eight years for returns. The trees are not much injured by insects. There are, however, the cacao pod disease (*Phytophthora omnivora*) and brown rot (*Diplodia cacaicola*) to be found on some of the estates which are not so well drained and looked after. The lands along rivers and coast most suitable for cacao have no natural drainage. They are below sea-level, and consequently 'kokers' have to be used to shut out the high tides, and in heavy weather they are opened twice during twenty-four hours to drain off the surplus water.

COST OF LAND AND DEVELOPMENT.

Crown land can be bought at less than 50c. an acre. It is usually heavily wooded, and the cost of bringing 1 acre of such land into cultivation with the necessary draining trenches is somewhat heavy. Forty dollars would cover the first twelve months' expenses, which would also include the cost of young cacao plants, easily purchased from the Government Botanic Gardens at \$1.50 per 100 plants, six to nine months old. The cost of keeping 1 acre in proper cultivation for the second and up to the eighth year would not exceed \$18 per annum. Some returns might be secured from growing catch crops, but this is an uncertain calculation. Buildings, curing house, and labourers' houses are additional costs. East Indian coolies and black labourers are employed.

The planting of rubber as shade for cacao has not yet been much tried, as no new properties are being established. The local Department of Agriculture has advised the planting of rubber as shade, and no doubt a few plantation owners will try the experiment. Two or three parties have obtained Crown lands, of which there is considerable area suitable for rubber growing. Probably the idea is to interest foreign capital. The colony is free from hurricanes, and the occasional abandonment of a sugar estate would appear to give a surplus of labour. The land of an abandoned plantation, after the buildings and machinery have been disposed of, can usually be bought for about \$5 per acre. It is usually well drained and possibly suitable for cacao. It suggests itself as a cheaper method of establishing a cacao plantation, and has the advantages of a labour supply on the spot. Transportation to the shipping port, Georgetown, is all by water. Freight by sailing craft or river steamer does not exceed 15c. per bag for distances of 30, 40, and 50 miles.

VEGETABLE HAIR.

The following account of this fibre, which is also known as 'erin végétal,' occurs in the *Consular Report* on Algeria for 1905:—

One of the most interesting, though perhaps least known, industries of Algeria is the production of vegetable hair. This hair or fibre is made from the dwarf palm (*Chamaerops humilis*), which grows in large numbers along the coasts of Algeria. A few years ago this plant was looked upon as a useless weed; now it has been found to contain a most useful fibre, and is largely sought after. This fibre is an excellent substitute for horse-hair, and is in great demand among upholsterers, mattress makers, harness makers, and carriage builders on the Continent for the cheaper class of goods. It is very much cheaper than horse-hair, and in many cases replaces it with advantage, especially as it is not affected or destroyed by insects.

Factories for the production of this fibre have been set up in many parts of Algeria, giving in each case employment to hundreds of Arabs, so much so that they have a saying 'that the palm was made to give bread to the poor.' Whole families—men, women, and children—may be seen cutting the palm leaves, making them into bundles, and carrying them sometimes many miles to the factories. Some of the nomad Arabs of the south have made a trade of this palm cutting, and coming up north they encamp near the factories.

In the factories large numbers of natives are employed passing the palm leaves through the shredding machines, spreading the fibre out to dry, spinning it into ropes, and making it into bales ready for export.

The ropes are made in various qualities, according to the thickness of the rope and the fineness of the fibre, the prices varying from £4 15s. to £6 a ton, quay Algiers. This is for the fibre in its natural colour, but when dyed black it increases about £4 a ton.

Originally, the manufacture into curled fibre was primitive, being done wholly by hand, but of late years steam machinery has separated the fibres. The machine is a species of automatic combing machine of which some twenty are now in use, the daily output per machine being about 7 tons.

Some idea of the elasticity of the fibre can be gained by the fact that a bale of erin cordage, weighing 220 lb., has a volume of about 40 cubic feet.

The industry should be of some interest to British manufacturers of cording and combing machinery, and especially to manufacturers of spinning machines, as at present all the spinning and twisting is done by hand.

Germany and Austria-Hungary are the principal buyers of this fibre, and it is utilized by the German War Office, being an article which, from sanitary, economical, and general utility points of view, is suitable for barrack and hospital bedding.

ST. VINCENT ARROWROOT.

An effort is being made to draw the attention of Canadian consumers to the qualities of St. Vincent arrowroot. The *Maritime Merchant*, of October 4, has the following article on the 'Three Rivers' brand, to which reference was made in the *Agricultural News*, Vol. IV, p. 45:—

Fred T. deWolfe & Co., of Halifax, are introducing to the wholesale trade of Canada a new article to this country, viz., 'Three Rivers' arrowroot, manufactured by D. K. Porter

& Co., of St. Vincent, West Indies. In order to bring this article to the attention of the public an exhibit is being made, at which samples and literature are distributed. While the value and utility of arrowroot has long received general recognition, the price has been too high to admit of its use on an extensive scale as an article of food, and consequently the grocery trade has not regarded the article as possessing great commercial importance. Costing, as it did, from 50c. to 60c. per lb., the field has been left largely to corn starch, which has become a familiar article in every household. By producing arrowroot in large quantities, however, and by having it packed and exported direct from the plantations of St. Vincent, D. K. Porter & Co. have been enabled to put the product on the market to retail at 15c. a package, at which price it is claimed to be much more economical than corn starch, as a package of 'Three Rivers' arrowroot goes about half as far again as a package of corn starch. At least this claim is made by the makers. Notwithstanding this reduction in the cost, which brings the article within the reach of the ordinary grocery trade, the assurance is given that 'Three Rivers' arrowroot is absolutely pure, guaranteed to contain no adulterations, and to possess very high quality. The article makes the most delicious custards, puddings, blanc-mange, etc., and is far more nourishing than products usually employed for these purposes. It is also used for thickening soups, gravies, stews, etc., and makes the most delightful tea cakes. In a book of forty recipes, prepared by Miss MacKirdy, Principal of the Glasgow (Scotland) School of Cookery, it is shown that a large number of tasty dishes may be prepared, the principal ingredient being 'Three Rivers' arrowroot. In fact it can be used in every instance where the housekeeper has been accustomed to employ corn starch, with this difference, that arrowroot is more nourishing and palatable, and at the prices at which it is now being placed upon the Canadian market, more economical. 'Three Rivers' arrowroot has been on the English market for many years and in the trade circles of the mother country it has become known for its high qualities by all who have traded in the same. It was awarded gold and silver medals at the Colonial Products Exhibition at Liverpool, in 1906, and at the Colonial and Indian Exhibition, 1905. It is now being introduced to the Canadian public through the wholesale and retail grocery trades, and we shall be surprised if it does not meet with a large share of favour.

FOREST PRODUCTS OF BRITISH GUIANA.

The *Board of Trade Journal* has the following review of the seventeenth Annual Report of the Council of the Institute of Mines and Forests of British Guiana:—

The total forest products of the colony exported during the year ended June 30 last only amounted to \$354,347, a fact which, the report observes, does not say much for the energy or the enterprise of its inhabitants, when the enormous extent of virgin forests which it possesses is taken into consideration. The chief forest product is balata, the export of which in 1905-6 amounted to 517,335 lb. valued at \$181,848, compared with 493,067 lb., valued at \$176,844, in 1904-5. The shipment of rubber, 3,822 lb., was more than double that of the preceding year. Greenheart and mora to the value of \$114,704 were exported as against \$108,506. The other exports were: ordinary lumber, 20,844 feet; firewood, 5,326 tons; shingles, 1,748,800; wallaba and hardwood posts, 4,591; charcoal, 63,930 bags; locust and other gums, 10,690 lb., and railway sleepers, 2,000.

WEST INDIAN PRODUCTS.

Drugs and Spices in the London Market.

The following report on the London drug and spice market for the month of September has been received from Mr. J. R. Jackson, A.L.S. :—

With the return of autumn there has been a general improvement of trade in the spice and drug market, which, it is hoped, may now go on uninterruptedly till the holiday season of Christmas again disorganizes the regular flow of commerce.

GINGER.

In ginger the sales and prices realized have been, on the whole, satisfactory. On the 5th., 166 packages of Jamaica were offered, of which 50 were disposed of at 79s. for bold, 65s. to 67s. 6d. for fair, and 63s. 6d. for dull washed. Out of 430 packages of Cochin and Calicut offered, only 5 were sold: washed rough Cochin was bought in at 32s.; good rough Calicut at 35s.; and bold brown Calicut at 40s. Good limes Japan was bought in at 25s. A week later the prices obtained were somewhat easier. On the 19th., the quotations were as follows: Small dull washed Jamaica, 60s.; good ordinary, 58s.; and ordinary small and dark, 53s. to 55s. At the concluding sale, there was no Jamaica offered; and out of some 600 packages of Cochin and Calicut only a few sold: native-cut Cochin at 55s.; bold and medium at 62s. 6d.; and cut tips at 40s. per cwt.

NUTMEGS, MACE, AND PIMENTO.

On the 19th., there were 350 packages of West Indian nutmegs offered, for which there was a good demand, nearly all being sold at steady prices, good quantities going at somewhat advanced rates, which were maintained at the close of the month.

Mace began with a very quiet tone at the first two spice sales, but on the 19th. over 100 packages of West Indian were offered and practically all disposed of at steady rates.

Pimento has fluctuated but very little during the month. On the 5th., fair quality was quoted at $2\frac{1}{8}$ d.; a week later a few bags of common were sold at $2\frac{3}{4}$ d.; fair being bought in at $3\frac{1}{8}$ d. On the 19th., 144 bags were sold, without reserve, at $2\frac{7}{8}$ d. for fair; and on the 26th., greyish to fair was offered, without reserve, and sold at $2\frac{5}{8}$ d. to $2\frac{3}{4}$ d. per lb.

ARROWROOT.

The month began with firmer prices in this article, the stock in London being reported as considerably reduced. At the first spice auction, on the 5th., 220 barrels of good manufacturing St. Vincent were offered, and the bulk sold at 2d.; a few lots realizing $2\frac{1}{8}$ d. Somewhat advanced prices were obtained a week later, when, out of 415 barrels of St. Vincent offered, 120 sold at $2\frac{1}{4}$ d. for fair manufacturing, and $2\frac{1}{2}$ d. to $3\frac{3}{4}$ d. for good. At the later auctions, no St. Vincent was offered, but the prices quoted privately showed a firm market.

SARSAPARILLA.

At the beginning of the month this article was reported to be selling readily. On the 12th., 11 bales of grey Jamaica were offered and sold at from 1s. 10d. to 2s. per lb., which was from 1d. to 2d. dearer than previous quotations; for 7 bales of coarse grey Guatemala, $11\frac{1}{2}$ d. was paid; and 8 bales of native Jamaica realized from 9d. to 11d. per lb. for ordinary mixed grey and yellow to fair pale red. At the last auction 33 bales of grey Jamaica were offered and sold at an advance of 1d. to 2d. per lb. on previous rates.

Twelve bales of fair, part coarse, Lima Jamaica fetched 1s. 5d. to 1s. 6d. per lb.

CANELLA ALBA, KOLA NUTS, LIME JUICE, OIL OF LIME, TAMARINDS, AND CHILLIES.

For good pale quill to ordinary dull Canella alba, 50s. was asked at the auction in the middle of the month. It was stated that privately several parcels had lately been cleared off the market for export, and an advance of about 10s. per cwt. was asked in consequence.

Of kola, some 40 barrels were offered in the middle of the month and 12 were sold; good bright Jamaica at $3\frac{1}{4}$ d. per lb., and another parcel of 17 bags of bright Ceylon was limited at $4\frac{1}{2}$ d. At the end of the month, kola was again offered, and 6 bags of fair Jamaica sold at 3d. and 22 bags of dark, part mouldy, at from $2\frac{3}{4}$ d. to 3d. per lb.

Of lime juice, ordinary brown raw Jamaica was sold on the 12th., without reserve, at $7\frac{1}{2}$ d. per gallon. At the close of the month, 5 cases of good pale distilled oil of lime, which was said to be scarce, were sold at from 3s. to 3s. 1d. per gallon. At the same sale, 20 barrels of new Barbados tamarinds sold, in bond, without reserve, at 16s. 6d. per cwt., and 2 barrels of dry West Indian, also in bond, were disposed of at 14s. per cwt.

Chillies have commanded steady prices during the month, fair red slightly yellowish East African fetched 34s. 6d.; good Nyasaland were bought in at 35s., and yellow at 30s.

NEW NITROGENOUS MANURES.

References have been made in previous issues of the *Agricultural News* to the utilization of atmospheric nitrogen in the manufacture of manures. The two new manures thus placed at the disposal of the agriculturist are calcium cyanamide or lime nitrogen and calcium nitrate or nitrate of lime.

The following note, from the *Journal of the Society of Arts* (September 21, 1906), contains interesting information in this connexion :—

An analysis is given in the *Journal des Usines à Gaz* of the respective values of the unit of nitrogen in ammonium sulphate, calcium cyanamide, and calcium nitrate to show the possibilities of the competition likely to arise from the conflict between the sulphate of ammonia derived from gas, the Chile nitrates, and the new compounds of nitrogen obtained by means of electric action. The total annual production of nitrates from Chile, with an average of 16.5 per cent. of nitrogen, may reach 1,567,000 tons, each kilogram of nitrogen in which is valued at $15\frac{1}{2}$ d. The estimated amount of ammonium sulphate produced annually by the chemical industries varies from 500,000 to 600,000 tons, and the kilogram of nitrogen in this salt is set down at $14\frac{1}{2}$ d., taking 21.2 per cent. of nitrogen throughout. In calcium cyanamide the value of the nitrogen may range from $13\frac{1}{2}$ d. to $15\frac{1}{2}$ d. per kilogram, while in calcium nitrate, under certain conditions, the kilogram of nitrogen may be produced at $12\frac{1}{2}$ d. Of course, the relative cheapness of the new nitrogen products will depend entirely upon the use of electricity generated by water power at very low rates.

Reducing these figures to values per pound, it will be seen that each pound of nitrogen in the Chile nitrates is valued at 7d., and in sulphate of ammonia at $6\frac{1}{2}$ d. Similarly, the value of the nitrogen in calcium cyanamide may range from 6d. to 7d. per lb., and in calcium nitrate to $5\frac{1}{2}$ d. per lb.

MARKET REPORTS.

London,—October 9, 1906. Messrs. KEARTON, PIPER & Co.; Messrs. E. A. DE PASS & Co. October 5, 'THE WEST INDIA COMMITTEE CIRCULAR,' October 9, 'THE LIVERPOOL COTTON ASSOCIATION WEEKLY CIRCULAR,' October 5, and 'THE PUBLIC LEDGER,' October 6, 1906.

ALOE—Barbados, 15/- to 60/-; Curaçoa, 18/- to 55/- per cwt.
ARROWROOT—St. Vincent, 2½d. per lb.
BALATA—Sheet, 1/5 to 2/-; block, 1/1 to 1/5½ per lb.
BEES'-WAX—£7 12s. 6d. to £8 per cwt.
CACAO—Trinidad, 68/- to 75/- per cwt.; Grenada, 61/- to 66/- per cwt.

CARDAMOMS—Mysore, 7½d. to 3/- per lb.
COFFEE—Jamaica, good ordinary, 40/- to 42/- per cwt.
COTTON—Medium fine, 6.65d.; West Indian Sea Island, medium fine, 13d.; fine 14d.; extra fine, 15½d. per lb.
Prices paid 6d. to 14½d. per lb.

FRUIT—

GRAPE FRUIT—7/- to 10/- per box.
BANANAS—Jamaica, 5/6 to 6/- per bunch.
LIMES—4/6 per box of 200.
ORANGES—9/6 to 14/- per box.
PINE-APPLES—St. Michael's, 2/6 to 6/- each.
FUSTIC—£4 to £4 10s. per ton.
GINGER—Jamaica, 53/- to 65/- per cwt.
HONEY—Fermented to dark liquid, 15/- to 19/6; pale to good bright, 20/- to 25/6 per cwt.
ISINGLASS—West Indian lump, 1/9 to 2/3; cake, 1/- per lb.
KOLA NUTS—2½d. to 1/- per lb.
LIME JUICE—Raw, 11d. to 1/2 per gallon; concentrated, £21 17s. 6d. per cask of 108 gallons; hand pressed, 3/- per lb. Distilled Oil, 2/8 per lb.
LOGWOOD—£4 to £4 15s.; roots, £3 10s. to £4 per ton.
MACE—Fair to good pale, 1/5 to 1/7; fair to good red, 1/2 to 1/4; broken, 1/2 per lb.
NITRATE OF SODA—Agricultural, £12 10s. per ton.
NUTMEGS—60's, 1/7; 70's, 1/1; 78's, 10½d.; 88's, 10d.; 98's, 7d.; 110's, 6½d.; 118's, 5½d.; 135's, 5¼d.; 156's, 5d.; 174's, 4¾d. per lb.
PIMENTO—Fair, 2¾d. to 2½d. per lb.
RUM—Jamaica, 2/2; Demerara, 11d. to 11½d. per proof gallon.
SUGAR—Yellow crystals, 16/6 per cwt.; Muscovado, 14/- to 14/6 per cwt.; Molasses, 10/6 to 11/6 per cwt.
SULPHATE OF AMMONIA—£11 18s. 9d. to £12 per ton.

Montreal,—September 14, 1906.—Mr. J. RUSSELL MURRAY.
(In bond quotations, c. & f.)

COCOA-NUTS—Jamaica, \$26.50 to \$28.50; Trinidad, \$25.00 to \$26.00 per M.
COFFEE—Jamaica, medium, 10c. to 11c. per lb.
GINGER—Jamaica, unbleached, 16c. per lb.
MOLASCUIT—Demerara, \$1.00 per 100 lb.
MOLASSES—Barbados, 26c. to 27c.; Antigua, 21c. per Imperial gallon.
NUTMEGS—Grenada, 110's, 18c. per lb.
PIMENTO—Jamaica, 6½c. per lb.
SUGAR—Grey crystals, 96°, \$2.50 per 100 lb.
—Muscovados, 89°, \$2.00 per 100 lb.
—Molasses, 89°, \$1.75 per 100 lb.

New York,—October 5, 1906.—Messrs. GILLESPIE BROS. & Co.

CACAO—Caracas, 15c. to 16c.; Grenada, 15c. to 16c.; Trinidad, 15c. to 16½c.; Jamaica, 13c. to 14½c. per lb.
COCOA-NUTS—Jamaica, \$30.00 to \$31.00; Trinidad, \$30.00 to \$31.00 per M.
COFFEE—Jamaica ordinary, 8¼c. to 8½c.; good ordinary, 8½c. to 8¾c. per lb.
GINGER—Dark scraggy root, 9c. to 10½c.; white to bright bold, 10¾c. to 12½c. per lb.

GOAT SKINS—Jamaica, Antigua, and Barbados, 59c.; St. Kitt's, St. Thomas, and St. Croix, dry flint, 49c. to 51c.; dry salted, 36c. to 48c. per lb.
GRAPE FRUIT—Jamaica, \$4.00 per barrel; \$2.00 to \$3.00 per box.
LIMES—\$5.50 to \$6.50 per barrel; \$2.50 to \$3.00 per box.
MACE—30c. to 35c. per lb.
NUTMEGS—West Indian, 75's to 80's, 19c. to 20c.; 90's to 100's, 14½c. to 15c.; 110's, 12½c. to 13c.; 130's, 10c. to 11½c. per lb.
ORANGES—Jamaica, \$2.00 to \$2.50 per box; \$4.50 to \$5.00 per barrel.
PIMENTO—5¾c. to 5½c. per lb.
SUGAR—Centrifugals, 96°, 4c.; Muscovados, 89°, 3½c. Molasses, 89°, 3¼c. per lb., duty paid.

INTER-COLONIAL MARKETS.

Barbados,—October 22, 1906.—Messrs. T. S. GARRAWAY & Co., and Messrs. JAMES A. LYNCH & Co.

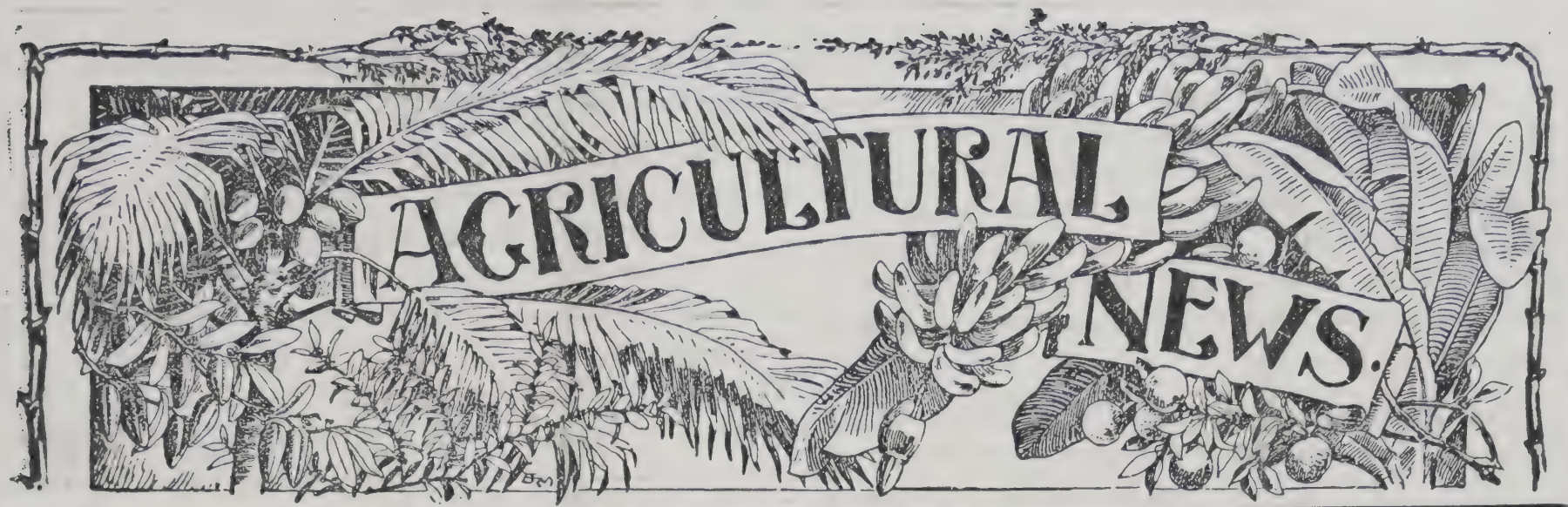
ARROWROOT—St. Vincent, \$4.50 to \$4.75 per 100 lb.
CACAO—\$12.50 to \$15.00 per 100 lb.
COCOA-NUTS—\$10.00 per M. for husked nuts.
COFFEE—\$10.50 to \$11.00 per 100 lb.
HAY—85c. to 90c. per 100 lb.
MANURES—Nitrate of soda, \$60.00 to \$65.00; Ohlendorff's dissolved guano, \$55.00; Cotton manure, \$42.00; Cacao manure, \$42.00 to \$45.00; Sulphate of ammonia, \$75.00; Sulphate of potash, \$67.00 per ton.
ONIONS—Madeira, \$2.00 to \$3.50 per 100 lb.
POTATOS, ENGLISH—\$2.40 to \$2.50; Nova Scotia, \$2.50 to \$2.66 per 160 lb.
RICE—Ballam, \$5.65 to \$6.25 per bag (190 lb.); Patna, \$3.00 to \$3.50; Rangoon, \$2.70 to \$2.75 per 100 lb.
SUGAR—No quotations.

British Guiana,—October 27, 1906.—Messrs. WIETING & RICHTER.

ARROWROOT—St. Vincent, no quotations.
BALATA—Venezuela block, 25c.; Demerara sheet, 38c. per lb.
CACAO—Native, 12c. to 13c. per lb.
CASSAVA STARCH—\$5.00 per barrel.
COCOA-NUTS—\$10.00 to \$12.00 per M.
COFFEE—14c. per lb.
DHAI—\$4.60 per bag of 168 lb.
EDDOS—60c. to 80c. per barrel.
MOLASSES—16½c. per gallon.
ONIONS—Madeira, 2½c. to 3c. per lb.
PLANTAINS—20c. to 36c. per bunch.
POTATOS, ENGLISH—Nova Scotia, \$2.75 to \$3.00 per barrel.
POTATOS, SWEET—Barbados, \$1.44 per bag.
RICE—Ballam, \$6.15 to \$6.25 per 177 lb.; Creole, \$5.35 per bag (ex store).
SPLIT PEAS—\$5.90 per bag (210 lb.).
TANNIAS—\$1.68 per barrel.
YAMS—White, \$2.16; Buck, \$2.40 per bag.
SUGAR—Dark crystals, \$2.12½ to \$2.60; Yellow, \$2.60 White, \$3.60 to \$3.65; Molasses, \$1.50 to \$1.60 per 100 lb. (retail).
TIMBER—Greenheart, 32c. to 55c. per cubic foot.
WALLABA SHINGLES—\$3.00, \$3.75, and \$5.25 per M.

Trinidad,—October 27, 1906.—Messrs. GORDON, GRANT & Co.

CACAO—Ordinary to good red, \$15.50 to \$16.00; estates, \$16.50 per fanega (110 lb.); Venezuelan, no quotations.
COCOA-NUTS—\$21.00 per M., f.o.b.
COCOA-NUT OIL—73c. per Imperial gallon (cask included).
COPRA—\$3.80 to \$3.90 per 100 lb.
DHAI—\$4.50 to \$4.60 per 2-bushel bag.
ONIONS—\$1.80 to \$2.00 per 100 lb. (retail).
POTATOS, ENGLISH—75c. to \$1.25 per 100 lb.
RICE—Yellow, \$5.50 to \$5.75; White, \$5.75 to \$6.25 per bag.
SPLIT PEAS—\$5.70 to \$5.80 per bag.
SUGAR—Grocery, \$2.25 to \$3.00 per 100 lb.



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West Indian Agricultural Con- ference, 1907.

REFERENCE has already been made in recent issues of the *Agricultural News* as to the possibility of the next West Indian Agricultural Conference being held at Jamaica.

As our readers are aware, the proposal to hold a Conference in that island in January last had to be abandoned owing to an unexpected difficulty in regard to steamer arrangements. The route of the steamers of the Royal Mail Company connecting with Jamaica was altered in October 1905, with the result that it took nine days to accomplish a voyage that formerly had taken only four days. Under the new conditions, which are still in force, it takes longer to go from Barbados to Jamaica than from Barbados to New York. This also means that fewer Jamaica passengers pass through on their way to and from the United Kingdom. There is also the fact that a reply by letter from Jamaica cannot be obtained in Barbados under thirty-five days. In process of time, unless some change takes place, it is evident that Jamaica will lose touch with other parts of the West Indies to the detriment of the common interests of all these colonies.

It is with a desire to maintain intercourse with Jamaica and promote an exchange of ideas in regard to matters of vital importance to the West Indies as a whole, that strenuous efforts have been made to hold the next West Indian Conference in that island.

The view taken by the people and Government of Jamaica in regard to the desirability of such a Conference is shown in the following extract from a letter from the Colonial Secretary, dated March 24, 1905 :—

I am directed by the Governor to inform you that both the Board of Agriculture and the Agricultural Society consider that it would be highly desirable in the interests of this colony that the next West Indian Agricultural Conference should be held at Jamaica.

I am to say that this Government is in entire agreement with these societies in the matter and that it would be a source of much gratification not only to the Government, but, his Excellency is sure, to the people of the colony as a whole also, if you could find it convenient to arrange for holding the Conference next year in this island. His Excellency need hardly assure you that this Government would heartily co-operate with you to make the Conference a success in every way.

The arrangements for the West Indian Agricultural Conference of 1907 are now so far advanced that, provided nothing unforeseen occurs, it is hoped that it will be carried through and prove as successful as any of its predecessors.

The question of conveying the Representatives to and from Jamaica within a reasonable time has been solved by the co-operation of Messrs. Elder, Dempster and Company, the Managers of the Imperial Direct West India Mail Service, who have undertaken that one of their steamers, the 'Port Kingston,' due to leave Avonmouth on December 29, should call at Barbados on or about January 8 next.

According to the present time-tables, the Representatives to the Conference from Trinidad will arrive by the Atlantic steamer, and those from British Guiana, Grenada, and St. Vincent by the Inter-colonial steamer, both due to arrive at Barbados on January 8. It is probable that the Representatives from St. Lucia and Dominica will also arrive the same morning by the 'Yare,' while those from Montserrat, Antigua, and St. Kitt's may arrive by one of the steamers of the Pickford & Black Steamship Company, Limited.

The 'Port Kingston' is due to reach Jamaica, on contract time, on January 11 and to leave on January 17, thus allowing about one week for the business of the Conference. If, as is probable, the 'Port Kingston' arrives at Barbados, on the homeward voyage, on January 21 or 22, the Representatives will be able to take advantage of the movements of the Royal Mail and other steamers and arrive at their several destinations (except in one or two instances) with little or no delay.

If the arrangements above indicated are carried out, it is probable that the Representatives to the Conference at Jamaica will not require to be absent from their homes for a longer period than in the case of the Conference held at Trinidad in January 1905.

As regards the advantages likely to be derived from a visit to Jamaica by men who are keenly

interested in the development of West Indian industries, it is needless to enlarge.

Jamaica is possessed of such rich and varied resources, and is at present engaged in the development of so many undertakings, that it cannot fail to afford valuable lessons in tropical agriculture. The principal industries consist of pen keeping, that is, the rearing of horses, mules, and cattle, with dairying and planting. The staple productions are sugar, rum, bananas, coffee, dye-woods, logwood and logwood extract, pimento (Jamaica pepper or allspice), cocoa-nuts, ginger, cacao, tobacco (including cigars and cigarettes), citrus fruits (including oranges, limes, and grape fruit), cassava starch, and cotton. Bee keeping is a profitable and increasing industry.

While a study of the circumstances under which these industries are being carried on cannot fail to interest visitors, it is probable that great advantage will also arise to the island from the presence of prominent agriculturists from other colonies, and the large fund of information they will bring with them and be ready to exchange with their friends in Jamaica.

To those interested in these Conferences who may wish to make themselves more fully acquainted with them, a reference may be usefully made to the *West Indian Bulletin* (Vol. V, pp. 289-390, and Vol. VI, pp. 1-246). These contain a full report of the proceedings at the Conference held at Trinidad in January 1905.

As regards the main idea of these Conferences, the opinion of enlightened men is that nothing is better calculated to enlist the best efforts of those engaged in agricultural pursuits, and that eventually these gatherings will 'come to great growth' in the West Indies. As stated by his Grace Archbishop Flood at Trinidad, the Representatives at these Conferences are 'no ordinary visitors, they are men of high scientific attainments, of wide practical experience, men that all the West Indies look up to for light and guidance in agricultural matters.' All departments of agricultural science, including Botany, Chemistry, Mycology, and Entomology, are represented. Also Elementary and Secondary Education in relation to agriculture. Valuable support is afforded by the Representatives of the chief Agricultural Societies who are in a position to present trustworthy information in regard to staple industries.

It is confidently hoped that Jamaica will do its share in assisting to render the forthcoming Conference a success and that all the leading men connected with agriculture will take an active and useful part in the proceedings.

SUGAR INDUSTRY.

Jamaica.

The Collector-General for Jamaica makes the following reference in his Annual Report for 1905-6 to the position of the sugar and rum industry in Jamaica:—

Since the abolition of the bounties the sugar industry in this island has shown considerable improvement. Stimulus has been given to the industry, which has resulted in the erection of better machinery, and closer attention to manufacture. Thus, the cost of production has been cheapened, whereby cane sugar is given a still further advantage over beet sugar, which, owing to the higher price of roots in Germany, Austria, and France, was produced this year at high cost.

One of the striking features in the year's figures is the appreciably higher prices obtained for rum; and judging from the indications that are at present in evidence, the future of Jamaica rum is most promising. The following extract from a recent report by Mr. Nolan shows the success attending the action taken under Law 26 of 1904 to protect Jamaica rum in the United Kingdom and elsewhere from imitation and frauds of all kinds: 'The statistical position of Jamaica rum was never better, and there is a good demand for new arrivals of shipments. On account of the large quantities of other rums on the market, Jamaica rum would, at the present time, be at least 3d. a gallon cheaper and difficult to move, but owing to the prominence the article has received in different papers, and other means of bringing it before the public, I am glad to say such is not the case. This matter of 3d. a gallon means from £15,000 to £20,000 to the planters of the island for the year.'

The Collector for the parish of Westmoreland reports as follows:—

The only works of improvement in the past year have been the erection of new machinery upon Retrieve and Retreat estates, respectively the properties of Messrs. John Hudson, and W. H. and J. Farquharson. On these estates the improvements have been considerable, and I understand that without the wearisome night working they now manufacture more sugar than they formerly did.

All the estates of this parish are 'hard about'—some are near the close of the crop and some are about mid-way. The yield is, I understand, good, and it is expected that the estimates will be realized. During December the price per ton of canes from the small cane farmers was reduced from 10s. to 7s., on account of the bad yield due to the then heavy rains; since then the position has improved for the cane planters, and now for the ordinary muscovado I understand that 2,500 gallons of cane juice (liquor) go to the ton of sugar on the estates in the eastern part of the parish. In the western districts the yield is slightly better, 2,300 gallons of liquor going to the ton of sugar. To make vacuum pan sugar 2,000 gallons of liquor are required to the ton.

The growth of canes has been exceptionally good, and, on account of the late rains, the yield has been high. Cane cultivation by cane farmers—pen keepers and small settlers—continues, and is increasing steadily. This industry received a set-back in the drop in the price per ton of canes in December last. The prevailing price is 8s. per ton, delivered at the estate. The price, roughly, is regulated by the price per ton of sugar; £8 per ton of sugar means 8s. per ton of canes.

I understand that the 'high ether' process in the manufacture of rum associated with the Island Chemist is being adopted by a few of the estates in this parish.

The Collector for Clarendon writes:—

In spite of the abandonment of Chesterfield and Perrin's in the southern portion of the parish, there has really been no loss on the production of sugar and rum; for these places have been purchased by some of the proprietors of Amity Hall factory, amalgamated with it, and used for growing canes to supply the factory. A network of tram lines now unites these places, so that there is now no difficulty in conveying canes, cut in the most distant field, to the factory.

Economical Working of Molasses.

In a bulletin recently issued by the Experiment Station of the Hawaiian Sugar Planters' Association, Mr. S. S. Peck discusses the composition of Hawaiian waste molasses. The object of the investigation will be learned from the following extract:—

No product of the sugar mill presents more interesting or perplexing problems than the final or waste molasses. It is not, of course, entirely without value, for it still has its uses as horse feed, fuel, fertilizer, or for conversion into alcohol; but, as far as the making of sugar is concerned, it is a waste product. The bulk of the difficulties of the boiling house is concentrated in the handling of these low-grade products, and by their success or failure in this respect is the true measure of the skill of the sugar boiler to be estimated. In the mills of Hawaii, to each ton of sugar manufactured, there are produced from 15 to 23 gallons of molasses of a sucrose content averaging 35 per cent. It is, therefore, of the greatest importance to be able to decide correctly whether or not the attenuation of the molasses is complete, within economic limits, and likewise to keep the amount of it down to a minimum.

The practical sugar boiler, with a correct understanding of the behaviour of his pans and the limitations of his house, can usually be relied upon to decide properly when the economical working of a molasses ceases. It has assumed a stickiness, or consistency, which his experience teaches him will not allow proper boiling, precluding the possibility of the separation of any more grain. The question of what causes this stickiness, or to what is the loss of crystallizing power due, is a subject of much discussion. It has been variously ascribed to ash, glucose, gums, and combinations of two or all three of these.

The following are the author's conclusions as to the result of his inquiries:—

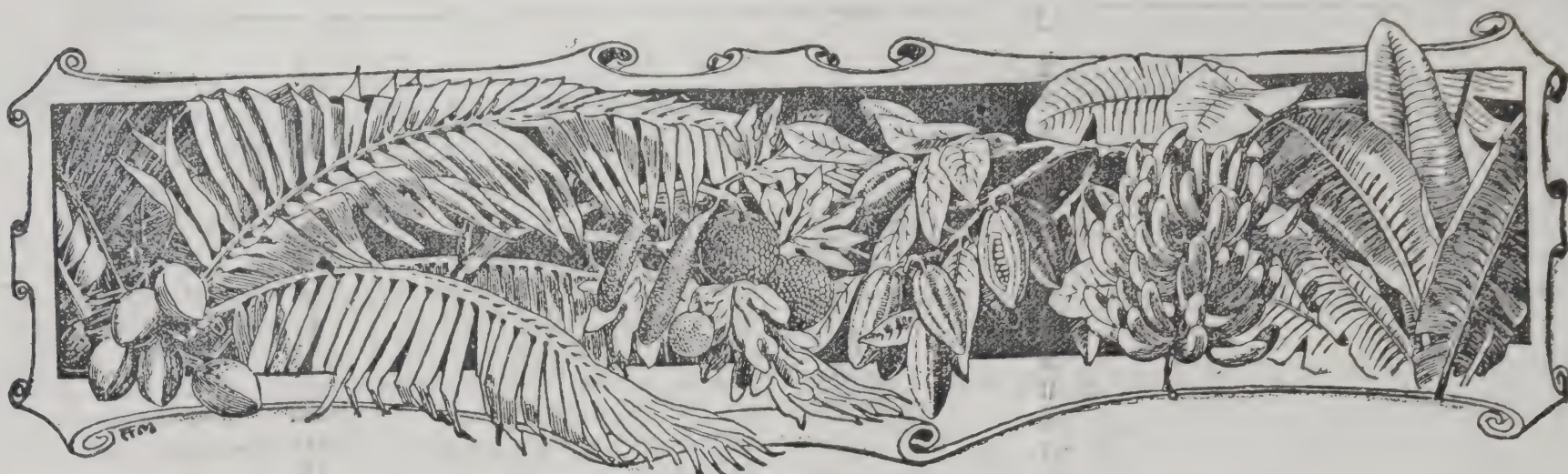
(1) The ratio of glucose to ash does not serve as an indication of the exhaustion of the Hawaiian molasses.

(2) The limit of the further recovery of sugar is established principally by the viscosity of the molasses.

(3) The viscosity of the molasses originates with the gums, and any method reducing the quantity of gums or their stickiness makes for the possibility of further recovery of sugar.

(4) The ashes of molasses and the composition of the ashes vary with the conditions of growth of the cane and the amounts of lime used in the clarification of the juices.

(5) A high salt content in the irrigation water increases the potash and chlorine in the ash, but not to an appreciable extent the soda with which the chlorine was originally combined.



WEST INDIAN FRUIT.

TESTING VARIETIES OF MANGOS.

It has been suggested that there is possibly a relation between the eating qualities of varieties of mango fruits and the odour of the crushed leaves of each variety.

A scholar of the St. Kitt's Agricultural School found that of half a dozen or more mango trees which had been specially planted from choice fruit, some possessed leaves which gave a strong odour of turpentine when crushed; some gave a slight odour of turpentine; some had rather a pleasant smell; while others emitted hardly any smell from their crushed leaves. He further noticed that those trees whose leaves smelt strongly of turpentine bore fruits strongly tainted with that undesirable substance; those which smelt but faintly of turpentine bore fruit with little turpentine taste; those whose leaves had a pleasant smell had a nice-tasting fruit, while the absence of turpentine in the leaves was correlated with its absence in the fruit.

If this is not merely a chance relation with regard to those particular trees, but can be corroborated by other observers (for instance, in Dominica and Trinidad), it might be a most valuable aid in the selection of mangos from seed. For if these relations turn out to be wide-spread, a grower would not have to wait until his seedling mangos bore fruit before he could determine which to reject, but could at once pull out of his beds all seedlings whose leaves when crushed had an odour of turpentine.

Observations on this point might be communicated for the benefit of readers of the *Agricultural News*.

JAMAICA BANANA INDUSTRY.

In his Annual Report for the year ended March 31 last, the Collector-General in Jamaica makes the following reference to the banana industry:—

The consumption of fruit throughout the world at the present time has enormously increased. This, no doubt, is due to the teachings of the advanced schools of dietetics, and in the list of the fruits most in demand, it is safe to say that the banana takes the most prominent place. In a report recently published by the United Fruit Company, it is observed that during their last fiscal year, the company handled from all sources of supply 30,000,000 bunches, as against 21,000,000 in the previous year, and it is noticed with regret that it is recorded that Jamaica never before produced such inferior fruit as during that year. These two facts, viz., the increasing demand for the banana, and the

failure of Jamaica to supply fruit of the best quality, should point a lesson to those interested in the cultivation of this crop. There is never a resurrection for a lost opportunity; where then is the wisdom of jeopardizing, by indifferent cultivation, the chance of holding the principal markets of the world, where there is an ever-increasing demand? The cultivations in Central America are now threatening to reduce the importance of the Jamaica plantations. Cuba, however, no longer stands a possible future rival, as it has been found that Eastern Cuba is too cool and dry for six months in the year to suit banana growing.

The markets to which we sent our bananas during the last three years are as under:—

	1903-4.	1904-5.	1905-6.
United Kingdom ...	276,455	694,952	1,217,901
U. S. of America ...	7,463,883	8,192,970	13,703,363
Canada ...	59,297	10,529	57,611
Other countries ...	3,608	5,288	2,260
Total num. of stems	7,803,243	8,903,739	14,981,135

ARBOR DAY IN ANTIGUA.

Mr. H. A. Tempany reports the following arrangements for the celebration of Arbor Day in Antigua:—

As usual, it is proposed to celebrate Arbor Day in Antigua on November 9 in town and country.

The direction of the ceremony is in the hands of the Central Arbor Day Committee which has been made permanent by the Government, thus ensuring the annual observation of Arbor Day, and, at the same time, providing a body which is responsible for the upkeep and care of the trees planted.

In the absence of Dr. Watts, the Chairman of the Committee, his Excellency the Governor has appointed the Hon. W. H. Whyham to act as Chairman.

The work contemplated this year is an extension of that begun in former years and includes the extension of the 'Ladies' Avenue' of mahogany trees on the North Sound road.

The action of the Government of Antigua in making the Central Arbor Day Committee a permanent one is likely to prove useful, and similar action might, with advantage, be taken in other islands.

HEDGE PLANTS FOR TROPICAL GARDENS.

Among the chief beauties of English country and suburban homes are the straight lines of wall-like green hedges, which encircle the lawn or flower-beds. Dwellers in the West Indies have a great advantage over the people of England in the charming variety of beautiful flowering shrubs which can, with a little trouble, be made into pleasing hedges around their gardens.

An *Eranthemum* (*E. maculatum*) makes a very good wall-like hedge in about three years, and is fairly free from scale insects. The line for the intended fence should be dug as deeply as convenient and preferably about 4 to 6 feet wide. No large tree must be allowed to come nearer the intended fence than about 10 to 15 feet beyond the spread of the tree's branches. For *Eranthemum* the cuttings should be first well rooted in sand and planted deeply in wet weather about 1 foot apart. For the first year or so, at each pruning, every stem should be cut back to 4 inches in length, to induce branching; but after two years, the hedge may be trimmed square with a flat top and perfectly vertical sides. The best way to do this is to trim the top by carrying a straight lath across the top at the required height, and to stretch a string on the ground on each side of the fence at the proper distance and moving the lath kept vertical along the strings, to trim the sides.

A striking effect may be obtained by surrounding the garden with a fence of hibiscus, of which there are several fine varieties and species. For instance, in a square garden, the centre half of one side fence may be made of the large single pink hibiscus with each end quarter of the double pink 'peach-blow'; the second side may have a centre of the large single scarlet, with the end quarters of the large double dark scarlet; the third side may be of the large single yellow (salmon), with the terminal quarters of the large double yellow; the fourth side may have a centre of the single white species, with one of the double whites at each end quarter. If these varieties cannot be obtained locally they may be purchased in Florida. Every time after the flowering branches have grown 3 or 4 feet long, they must be cut back to 6 inches, some care, however, being taken to keep the hedge approximately even, the slower-growing kinds being allowed a little more than 6 inches, and the rapid growers a little less. In about three years, the hedges, when in flower, will be a beautiful sight, the flowers showing on the single kinds almost as great a spread as the leaves. If scale insects are seen on the old stems, they must be wiped off with a rag dipped in strong kerosene emulsion.

It may not be generally known that the *Casuarina*, the tamarind, and the lime can be made into hedges, if kept well shorn. Excellent examples of the two former can be seen in Barbados. Good hedges can also be made from the Barbados cherry (*Malpighia glabra*), wild coffee (*Clerodendron aculeatum*), the limonia (*Murraya exotica*), *Acalypha tricolor*, the sweet lemon (*Triphasia Aurantiola*), the Cape jasmine (*Gardenia*), the *Ixoras* with their brilliant scarlet flowers, *Thunbergia erecta* with its bright violet-blue blossoms, the cushaw (*Acacia tortuosa*), bread-and-cheese (*Inga Unguis-Cati*), and from *Acacia sphaerocephala*. But if not kept regularly shorn or pruned they soon become irregular and unsightly.

A promising plant for a hedge is the large-flowered scented jasmine (*Jasminum grandiflorum*). It can be readily propagated by layering or by making cuttings of pieces of stem with large buds. It must be cut right back with pruning shears every now and then.

The growth of hedges at the Montserrat Botanic Station is described in the *Agricultural News* (Vol. III, p. 233, and Vol. IV, p. 287).

ORNAMENTAL SEEDS.

'The use of ornamental seeds in the manufacture of household articles and for personal adornment is common in many countries,' says the *Kew Bulletin*, 'but in few perhaps has the application of natural forest seeds become an industry so definite as appears to be the case in Mazagon, Bombay.'

This industry was described in an article in the *Times of India*, for July 13, 1906, the following brief summary of which may be of interest:—

The Indian jungles are remarkable for the number of hard, bright seeds of many colours which are found upon their trees and climbing plants. The beauty of many of these seeds and their durability must have suggested their use as ornaments, but the difficulty of piercing them regularly and cheaply seems to have stood in the way until the Editor of the *Indian Textile Journal* took the matter in hand.

The drilling of the seeds was the first problem to be solved, and as they varied greatly in shape, appliances had to be devised that would hold them and at the same time guide the drill so that it might pierce them in the desired manner. The seeds were finally held in an instrument resembling a nut cracker with conical recesses on the inner sides which held the seeds, and a hole passing through the apex of the cone which guided the drill. These 'clamps' were made of hard Indian wood, while the steel of knitting needles and old bicycle spokes was found to be of excellent quality for drills.

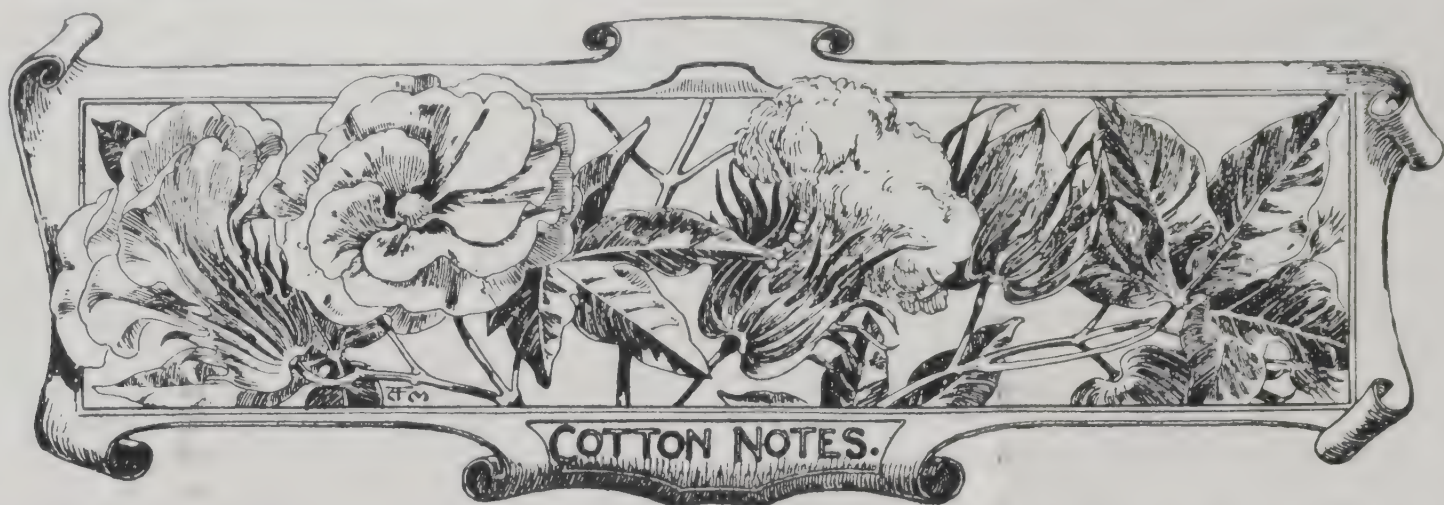
The typical machine now consists of small horizontal drill-heads arranged along a narrow table which accommodates six drillers. The clamp holding the seeds rests upon a small adjustable bracket, which supports it at the level of the drill point; and power is applied by a coolie who turns a wooden wheel at the end of the table. A cord from this wheel makes a single turn around the small pulley of each drill and returns above them to the wheel. One labourer thus serves six drills without any complication of mechanism.

The seed and bead industry is interesting for several reasons. It is based on the use of materials which were previously without value, and these materials are worked up with the aid of new tools and appliances designed expressly for them under very strict limitations as to cost and complication. It should take a prominent place among the small industries of India.

Among the charming devices produced from these ornamental seeds are necklaces, napkin-rings, hat-pins, buttons, bracelets, seed-partières, and screens, which find a ready sale at remunerative prices.

There are in the West Indies many of these ornamental seeds, and it is likely that a greater use might be made of them, especially if some such simple contrivance as that described above were adopted. A fairly complete list of West Indian ornamental seeds was published in the *Agricultural News*, Vol. III, p. 395. Of these mention may be made of the following:—

Crabs' eyes (*Abrus precatorius*), Circassian seeds (*Adenanthera pavonina*), coral beans (*Erythrina Corallodendron*), jumbie beads (*Ormosia dasycarpa*), Job's tears (*Coix Lachryma-Jobi*), soap berries (*Sapindus Saponaria*), lucky beans (*Thevetia nereifolia*), and the grey and the yellow horse nickers (*Caesalpinia Bonducella* and *C. Bonduc*).



WEST INDIAN COTTON.

Messrs. Wolstenholme & Holland, of Liverpool, report as follows, under date of October 22, in regard to West Indian cotton in the Liverpool market:—

Our last report was dated the 8th. instant, and 20 bales of oddments have been sold since at 9d. to 11½d.

During this period, the American Sea Island crop has suffered from further storms, and prices of all descriptions of Sea Island are dearer in Savannah, to the extent of ½d. to 1d. per lb.

COTTON PROSPECTS IN ST. VINCENT.

In forwarding a list of cultivators of Sea Island cotton in St. Vincent for the 1906-7 crop, Mr. W. N. Sands, Agricultural Superintendent, states:—

It will be observed that the acreage planted is 1,534¼ acres, but an area of about 40 acres, planted as an experiment in the Carib country, is not included, as Mr. Simmons does not think he will get much cotton from it, and my observations lead me to the same conclusion. The growth made is very poor and the plants are diseased.

Last year 790 acres were planted, so that this season's cultivations are nearly 100 per cent. larger.

You will observe that, in the list, there are this year a number of small growers; about seventy have approximately 180 acres between them.

ANTIGUA COTTON CROP.

Mr. H. A. Tempany, B.Sc., Acting Superintendent of Agriculture for the Leeward Islands, has forwarded the following information on the cotton crop in Antigua:—

With the exception of a few small lots, the entire Antigua cotton crop has been disposed of, and the money received and handed over to the various owners.

In all, 512 bales, containing 96,948 lb. of lint, have been shipped, and of this 508 bales, containing 99,270 lb. of lint, have been sold and the money distributed; the actual gross proceeds from the sale of this cotton, without including charges, etc., have been £4,864 14s. 4d., and this gives an average price for lint of 14½d. per lb. for the entire crop.

As regards prospects for the coming crop, the excessive rainfall for September has had the effect of stimulating the growth of weeds to such an extent that growers here have experienced very great difficulty in freeing their crops from weeds. On this account, and also on account of the difficulty of obtaining labour, several fields of cotton, have, I understand, had to be abandoned. In addition, there is a tendency on the part of growers to plant too closely, the disadvantage of too close planting having not yet been fully grasped.

SEASONABLE NOTES.

The picking season has now begun, and planters are again advised to be most careful with their crop.

Proper picking bags should be supplied to all the pickers.

Stained cotton should be kept separate from the clean cotton by the pickers in the field.

The first cotton picked from any field is always weak, and it would be advisable to keep it separate from the later ripening cotton and ship it by itself.

Owing to the heavy rainfall in September, the seeds from the early cotton will require more drying than would have been necessary had the season been a drier one. Planters are recommended to sun their cotton thoroughly, and when it is necessary to store any quantity of seed-cotton, to have it occasionally turned and opened out.

Attention should be given to the house in which seed-cotton is stored on an estate. It should be dry and airy and perfectly clean.

Planters can easily ascertain the condition of the cotton plants in their fields. Plants in a good healthy condition will be found to be carrying all their bolls even on the lower branches, while those in a less robust condition almost always drop them from the bottom branches, and often lose many from the higher branches.

It would be very useful if planters would examine the cotton plants in any crowded field or part of a field, for if such plants are examined it is most probable that they will be found to have lost the bolls from their lower branches.

CARAVONICA COTTON.

Many references have been made in agricultural and other papers to the remarkable qualities claimed for the Caravonica cotton. The following statement in regard to it was made in the Annual Report of the Queensland Acclimatization Society for the year ended March 31, 1905:—

During last year considerable attention has been attracted to certain varieties of cotton in the Cairns district, and named Caravonica. The society has received seed and lint of this cotton, one considerable parcel having been handed direct to the writer by Sir Herbert Chermiside, in the original package as sent to him by Mr. Thomatis, who has enthusiastically taken up the question of this supposed new variety. Most careful comparison has been made in various ways with this variety with rather disappointing results. In appearance little, if any, difference can be perceived between it and other cottons well known in the States. The Overseer has grown it alongside the plants which it resembles, and can discover no variation. A rather poor yield of this variety may be a circumstance that would

disappear with the planting of seed from plants grown under local conditions.

The Overseer has examined the Caravonica variety as grown in the North, and neither he nor Mr. Jones, who has also been comparing this variety with other well-known sorts, can detect any superiority. To all intents it is one of the Egyptian type.

JAMAICA ORANGES.

The following note on the Jamaica orange industry is extracted from the Collector-General's Annual Report for the year 1905-6:—

It has often been said that the Jamaica orange is the finest in the world. This may be true or may not be, but the fact remains that Jamaica is capable of supplying oranges that need fear no competition. There is, however, a 'but' that bars the entrance into the enjoyment of the privilege that should be ours, and this barrier can only be removed by the people interested in the industry. So much has been said and written publicly on the question of picking immature fruit and bad packing, that I refrain from adding to the literature on the question. There is a great possibility in the industry; it is an asset of great value to the people, but is subject to keen competition, and can only come to a full development by being most jealously safeguarded, and by the adoption of the most intelligent methods in marketing. The markets to which we sent our oranges during the last three years are as under:—

EXPORTS OF JAMAICA ORANGES.

	1903-4.	1904-5.	1905-6.
United Kingdom ...	12,160,750	18,683,600	21,640,730
U. S. of America ...	64,225,690	47,441,518	44,801,671
Canada ...	4,515,850	6,150,640	7,479,875
Other countries ...	1,728,350	777,350	581,275
Total num. of oranges	82,630,640	73,053,108	74,503,351

USE OF VOLCANIC SAND IN EASTERN CANARIES.

The following is an abstract of an article by Professor Dr. K. Sapper in the *Tropenpflanzer*, for May 1906, on agriculture in the eastern Canaries. This account of the use of volcanic sand as a means of conserving soil moisture is of particular interest in the West Indies:—

In the two eastern Canary Islands, Fuerteventura and Lanzarote, agriculturists have to contend with violent winds and great lack of rain. This is not so much the case in the middle and especially the western Canaries. In the larger islands of these two latter groups Palma, Tenerife, and Gran Canaria, artificial irrigation can be practised. In Lanzarote, on the other hand, there may be perfectly rainless years, and there are very few perpetual springs. Nearly all the water in that island is stored up in cisterns from the rain. In dry years, the people in the drier south of the island have

to buy their water from those of the more rainy north, and water is even brought in sailing vessels from Gran Canaria.

When there is a sufficient rainfall, the land, though stony, yields good crops, and is carefully tilled with shallow ploughs, drawn by camels. But the harvest is very uncertain, and only where the land is covered with a layer of volcanic sand, which prevents the true soil from drying up or being overheated, is a certain harvest to be expected, when there is a lack or total absence of rain. In many places the layer of ash is so deep that most crops cannot be raised. But just these places have been found specially suitable for grapes, fig trees, pear trees, and others. For each plant a pit is made in the ash, reaching to the true soil, in which the plant is set as usual.

On the interior plateaux of Lanzarote the eruptions of 1730-6 covered large extents with ashes, 1, 2, or more yards in depth.

Since the sides of the pits must have a very gentle slope (from the loose nature of the ash), the pits have to be far apart. So in an acre only very few plants can be set out. But experience has shown that the plants, especially the grapes, compensate by very heavy bearing for the loss occasioned by the wide planting.

When long ditches are dug and a row of plants is set out in them, they have to be protected by cross walls of loose stone between each plant, but these plants do not succeed so well, being nearer each other. If the ash is less than 3 feet thick, a semi-circular wall of stone must be built on the windward side of each vine.

A shallow layer of ash is not suitable for grape vines in the eastern Canaries, but is right for cochineal cactus, tomatos, onions, maize, peas, etc. In the western Canaries such soils are best for grapes, and black ash seems better than grey. The people of Lanzarote carry volcanic ash and spread it over their fields to a depth of 4 inches; such a field is called in Lanzarote 'arenar.' The soil is stamped hard first. In planting in such a field a hole is made with an iron point about $\frac{3}{4}$ inch deep in the true soil, the seed of maize, peas, onions, etc., put in and covered over with the ash again. To manure such fields the ash is carefully removed from a small place at a time, the manure spread on the soil and the sandy ash replaced. If through carelessness the ash becomes mixed with soil, the field is no better than one without ash. Those fields which are not sanded are sown with wheat or barley, crops which can grow with a minimum of moisture. They are not ploughed deeper than 3 inches, except in the gullies.

In northern Lanzarote camels can be seen everywhere carrying loads of volcanic ash for 'sanding.' A 'sanded' field costs about forty times as much per acre to purchase as an 'unsanded' one. The use of 'sanding' means the certainty of a crop. As cochineal has lately risen in price, many of the lately 'sanded' fields of Lanzarote are used to grow the *Opuntia* on which the cochineal feeds.

The covering of volcanic ash not only prevents evaporation from the soil, while letting the rain through, but also entirely prevents excessive heating. For instance, while the temperature of the surface of the ash in sunshine, $1\frac{1}{2}$ inches deep, was $44^{\circ}\text{C}.$, at 8 inches deep between ash and soil, $30\frac{1}{2}^{\circ}\text{C}.$, and 3 inches under the soil, $29^{\circ}\text{C}.$, the 'unsanded' soil near by at 1 inch deep was at $36\frac{1}{2}^{\circ}\text{C}.$ Perhaps in other regions with poor rainfall it might be possible by spreading ordinary sand, if volcanic ash is not procurable, to obtain assured crops in dry years.

EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming, should be addressed to the Commissioner, Imperial Department of Agriculture, Barbados.

All applications for copies of the 'Agricultural News' should be addressed to the Agents, and not to the Department.

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NOTES AND COMMENTS.

Contents of Present Issue.

Some of the arrangements which it is proposed to make in connexion with the West Indian Agricultural Conference to be held in Jamaica in January 1907 are referred to in the editorial in this issue.

There are indications of progress being made in the sugar industry of Jamaica. (See p. 355.) Sugar planters are also likely to be interested in the note on the economical working of molasses.

Devices are described on p. 357 which have been found useful in India in dealing with ornamental seeds. An industry of some importance has been established in Bombay, in which these seeds are utilized in the manufacture of various ornamental articles.

Notes on the prospects of the cotton crop in St. Vincent and Antigua appear on p. 358. The attention of cotton planters is drawn to the seasonable notes dealing with cotton picking; reference should also be made to the article on p. 362 on the use of Paris green, in which planters are advised how to apply this insecticide in the most economical and, at the same time, most effective manner.

Specimens of blood-sucking flies are required at the British Museum (Natural History) in connexion with investigations as to the importance of these insects as possible disseminators of disease-causing organisms. (See p. 363.)

The first portion of the summary of a paper on the economic uses of the palms is published on p. 366.

Agriculture in St. Lucia.

Under the heading 'Agricultural Improvements and Progress,' the *St. Lucia Blue Book* for 1905 has the following: 'Many thousands of plants of improved varieties of sugar-cane have been introduced for trial on the large sugar estates. Cacao plantations are being gradually extended, and better methods of cultivation are being adopted with good results. The cultivation of limes is being gradually extended. Cotton growing has continued in the experimental stage.'

The principal products of the island are sugar and cacao. Of the former there were exported, during 1905, 3,721 tons of usine, 792 tons of muscovado, and 803 casks of melhado, of a total value of £45,163. The exports of molasses were worth £848, those of rum £424. Of cacao 16,907 cwt. were exported, representing a value of £38,041.

Of minor products the following items of exports are of interest: 89,000 mangos, to Barbados and St. Vincent, of a value of £349; 204 cases of honey, £253 10s.; hides, £615; musk seed, £113; and 15,263 pimento sticks (at 8s. per dozen), £508.

Improvement of West Indian Fruits.

Readers of the *Agricultural News* will probably be familiar, in a general way, with the good work that has been accomplished by Luther Burbank in connexion with plant breeding, as it has formed the subject of a number of popular articles in the British and American magazines.

This work is brought home to the West Indian planter in an interesting article in the *Cuba Review*, in which Professor C. F. Baker sets himself the task of answering the question: 'What would Burbank do with the fruits of Cuba?'

Every horticulturist in the West Indies is struck with the enormous amount of work that might be done in improving the native fruits, in reference either to their eating or to their shipping qualities.

As Professor Baker says, 'in all this work Burbank has used no magic hand other than hard work and the persistent application of laws long known to govern plant breeding.' He understood the advantages of intelligent seed selection, the tendency of cultivated plants to variation, and also the possibilities of combining by crossing the good qualities of several older varieties. It is along these lines, probably, that Burbank would set to work on Cuban fruits.

Systematic search would be made among the many seedling varieties for the trees that produce the 'gilt-edged fruit,' to serve as sources for the propagation of uniform orchards of all the valuable sorts. This would refer, amongst others, to grape fruit and oranges.

He would set about the improvement of native fruits by the introduction of new blood, budding and grafting the latter on to native stocks.

Among the fruits referred to as worthy of scientific attention are mango, citrus fruits, the various anonas (sour sop, sugar apples, custard apples), sapodillas, etc.

Minor Industries of Hawaii.

According to an editorial in the *Hawaiian Forester and Agriculturist*, dealing with the trade returns between Hawaii and the United States mainland for the twelve months ended June 30 last, encouraging progress has been made, particularly in the minor industries.

Importance is attached to the fact that the exportation of refined sugar increased by over half a million dollars. The refining of sugar in Hawaii is confined to one plantation and is one of the newest industries.

Large increases are shown in the exports of honey, bees'-wax, coffee, canned fruits, hides and skins, leather, tallow, rubber, and rice.

The increase in canned fruits is chiefly attributable to the development of the pine-apple industry, and this industry is expected to continue to develop. It is also anticipated that the export of rubber will form one of the most valuable assets of the territory.

Surprise is expressed, in view of the excellent quality of Hawaiian-grown sisal hemp, that the value of the exports of fibre has decreased. The article concludes: 'With sisal and canned fruits already taking a place among our exports, and with rubber, tobacco, and fresh fruits promising to establish themselves in the near future, the material prosperity of an increasing number of small producers will be advanced to the immense benefit of the territory.'

Castilloa Rubber in Panama.

A report by the United States Consul at Colon deals with the cultivation of *Castilloa* rubber in Panama. *Castilloa elastica* is the natural rubber tree for this country, which is its natural home. Its productive life may be reckoned at twenty-five years. It must be protected from high winds either by the location of the plantation, or by other trees planted in lines through the plantation across the direction of the prevailing winds as wind-breaks. The soil must be a deep loam, which will hold plenty of water during the dry season, and will allow of the natural drainage of the surplus water of the rainy season, as the *Castilloa* will stand neither desert nor swamp conditions.

Eight years is the usual age to commence tapping, and April and November seem to be the best months. V-shaped cuts are used, two or three at a time. The latex is caught in earthen vessels and transferred to a barrel; 5 oz. of either common salt or of washing soda are added with water; after one or one and a half days of frequent stirring, the water is run out of a faucet in the bottom. The process is repeated till the rubber is white.

Five hundred and fifty thousand rubber trees (*Castilloa*) are estimated as being in the plantations in Panama. The largest plantations are found in the Darien district at Tapia, and on the lands of the Mariato and Suay. In 1905 the export of rubber from Panama, which is 80 per cent. of the total exports, was estimated at 176,000 lb., and valued at \$88,000 gold.

Exports of German Colonies.

According to statistics recently published, the value of Germany's imports from her colonies has been more than doubled in the last three years. German West Africa exports more to the mother country than any other colony.

From German East Africa rubber is the leading article of export, 874,720 lb., worth about £64,000, having been shipped from there in 1905. Bees'-wax comes next with 797,620 lb., valued at £20,000. The exports of coffee were less in 1905 than in the previous year.

Among the exports of the Cameroons and Togoland, also, rubber occupied the principal place 2,220,020 lb. valued at £330,000, having been exported. Palm nuts, cacao, and ivory were also shipped.

Copra is the principal product of Samoa.

West Indian Bulletin.

The first article in the latest issue of the *West Indian Bulletin* (Vol. VII, no. 3) is one by the Hon. Francis Watts on 'Manurial Experiments with Cacao in Dominica.' It contains tables and diagrams relating to the return from manurial experiment plots for four years, which show very clearly the financial results of adopting a rational scheme of manuring. Returns are recorded from experiment plots in country districts conducted by the Agricultural Department and by Messrs. Rowntree & Co.

Mr. W. R. Buttenshaw contributes an article on the cultivation of chillies or capsicums, abroad and in the West Indies. Details are given as to markets, cultivation, and drying.

Broom corn has been successfully grown in the West Indies, and a market for the product has been found in Canada. The abstract of articles on the cultivation of broom corn in America and Australia will therefore be of value to actual or prospective growers of this product.

The Hon. Francis Watts and Mr. H. A. Tempny are co-authors of an article embodying the results of an inquiry into the fermentation changes occurring in muscovado sugars. These changes seem to be concurrent with the appearance of 'gum' in the juices and masecutes and with seasons of drought. The polariscopic test increases and then falls. The changes are due to micro-organisms most probably reaching the sugar after its preparation.

An important article follows on a subject of pecuniary interest to all agriculturists, viz., the utilization of atmospheric nitrogen for agricultural purposes. This deals with the manufacture and use of two new nitrogenous manures, calcium cyanamide or lime nitrogen and calcium nitrate or nitrate of lime.

This number also contains articles dealing with the meteorology of the Leeward Islands. Other articles are: 'Some Imperial Aspects of Applied Chemistry,' 'Forestry in the West Indies,' and reports on manurial experiments carried on with cotton during last season in the Leeward Islands and in Barbados.



INSECT NOTES.

The Use of Paris Green.

Previous to the revival of cotton cultivation in the West Indies only five years ago, very little Paris green was used in these islands. At the present time the amount used in a year is, in comparison, enormous.

In a recent number of the *Agricultural News* (Vol. V, p. 346) reference was made to the great amount of waste in the use of Paris green. In the present article the use of different machines and appliances for distributing Paris green in the cotton field is discussed.

The cloth bag is a simple, effective, cheap, and, if properly used, economical device for distributing Paris green. The bag should be made of ticklinburg, and not of ordinary burlap, such as is used for bags for feeding stuffs and artificial manures. A bag of ticklinburg can be used in such a way that $\frac{1}{2}$ lb. of Paris green and 3 lb. of lime can be applied in a thorough dusting of an acre of young cotton; or $1\frac{1}{2}$ lb. of Paris green and 9 lb. of lime for an acre of full-grown cotton.

The Acme powder bellows is also cheap and effective. This machine can be imported at a cost of about 3s., and with it a labourer can cover thoroughly a somewhat larger area of cotton than with the bag.

The Champion powder gun is a larger and more complicated machine than the Acme bellows, the cost being about \$7.50 in Barbados. With this machine, the labourer can do more work than with any of the other devices, doing it very well and without waste of material.

In certain of the West India Islands, tin shakers or dusters are in use. These are made in different sizes and shapes, varying in cost from 1s. to 3s. They are made with the bottom perforated with fine holes, or the bottom of fine-mesh wire gauze. Very few of them are economical of material, as it is almost impossible to get the perforations sufficiently small or the gauze fine enough to prevent the escape of more Paris green and lime than is needed. Many planters who had these tins made have found that, by using a ticklinburg bag inside the shaker, it has been possible to use the correct amount of material.

In applying Paris green, it is desirable that the poison mixture should be distributed *evenly* and *lightly* over the leaves of the cotton plant. It is always a mistake to apply so much that the leaf shows a solid white surface. It must be remembered that very little poison is required to kill a cotton worm.

When a field of cotton has received more than $1\frac{1}{2}$ lb. of Paris green per acre in a single application, it may safely be assumed that there has been a waste, no matter what proportion of lime has been used; and when the amount used runs to 4 lb. or 5 lb. of Paris green, then the waste is enormous. This is a matter which requires more attention from cotton planters. Most planters now recognize the necessity of using Paris green to check the ravages of the cotton worm; but many are not awake to the necessity of using it in a careful manner, and in such a way as to get the greatest good from the expenditure involved.

FUNGUS DISEASES OF PLANTS IN CEYLON.

As some of the information about fungus diseases of plants contained in the report of the Government Mycologist for Ceylon, for 1905, is likely to be of interest to planters in the West Indies, a few short extracts have been made:—

Para rubber (*Hevea brasiliensis*) has received considerable attention, and records show various diseases of leaf, stem, root, and fruit. The canker disease of the stem, caused by *Nectria diversispora*, has diminished in extent. It is stated that, 'with regard to canker, the outlook is decidedly improved. Excision of diseased tissue has in all cases proved efficacious, without injuring the subsequent growth of the tree.' Further it is urged that periodic inspection of trees should be continued, for the disease may easily be kept in check if the first stages are noted, but that neglect results in the death of the tree.

A decay of the fruits of *Hevea brasiliensis* occasioned serious loss during the year. It is caused by a species of *Phytophthora*, very similar to that found on cacao pods in Trinidad, St. Lucia, and probably British Guiana, and it is advised that all diseased fruits should be collected and burnt, so as to prevent any possibility of further spread of the disease.

The Central American rubber tree (*Castilloa elastica*) is sometimes attacked by a wound parasite, *Botryodiplodia elasticae*, nov. sp., which gains an entrance through a previous injury and converts the bark of the tree into a soft, rotting mass. Excision of all diseased tissue will save a tree, if it be done before the fungal mycelium has spread into the deeper tissues.

The fungus diseases of tea have been classed under leaf, root, and stem diseases. Work with root diseases has been directed towards the separation of the different fungi, so as to be able to suggest methods of prevention to suit each individual case. The horse-hair blight is similar to the thread disease of cacao that has been reported from St. Lucia and Dominica. It spreads over the bush in all directions; it is therefore advised that all attacked trees should be pruned, and all the diseased prunings collected and burnt.

Cotton is reported to be free from serious fungus diseases, but 'rust,' produced by *Uredo gossypii*, has been found on a native variety, while the roots of the Caravonica variety have suffered from a species of *Hymenochaete*.

Cacao has suffered from a root parasite in a few instances, and *Colletotrichum incarnatum* has been found on 'brown' pods. Canker is now kept well in hand, and 'the value of canker excision and the spraying of pods is now proved beyond dispute by the results obtained at the Experiment Station and elsewhere.' It is pointed out that attention should now be directed to the possibility of reducing the cost of spraying by the adoption of more modern appliances.

Ground nuts have suffered from a leaf disease, which usually appears when the plants are about a month old. Infection experiments have been conducted with this disease and they show that the fungus (*Septogloeum arachidis*) 'may be transferred to a succeeding crop by means of the dead leaves in the soil; that the disease spreads rapidly after the plants are about a month old; and that it might have been prevented by disinfecting the nuts.'

On the whole, cultivated products appear to be comparatively free from disease, which may be accounted for by the prompt attention given by planters to diseases and by the systematic destruction of diseased material.

BLOOD-SUCKING INSECTS AND TROPICAL DISEASES.

The following is a circular despatch from the Secretary of State for the Colonies, inviting Government Medical Officers and Scientific Officials to make and forward to the British Museum collections of blood-sucking flies:—

The Secretary of State for the Colonies—to the Governor of ———.

Downing Street,
November 6, 1905.

Sir,—I have the honour to transmit to you, with reference to Mr. Chamberlain's circular despatch of December 6, 1898, the accompanying copy of a letter, with enclosures, from the British Museum (Natural History).

2. I should be glad if you would bring these papers to the notice of the Government medical and scientific officials, and ask them, if there are facilities for the purpose, to be good enough to make and forward to the Museum as soon as possible the collections of blood-sucking flies which are required.

3. A list of the apparatus recommended for use in collecting these flies will be found on pp. 13 et seq. of the enclosed pamphlet, but it has occurred to me that some of the articles may not be procurable locally, and, if such is the case in the colony under your administration, I request that you will transmit to me as soon as possible a statement showing what articles are needed. I will then ascertain, if necessary, whether the British Museum is prepared to supply them, but I trust that in most cases the colony itself will be willing to defray the small expense involved.

I have, etc.,

(Sgd.) ALFRED LYTTTELTON.

The Officer Administering
the Government of ———.

Memorandum by Director of British Museum (Natural History Section).

BLOOD-SUCKING INSECTS AND TROPICAL DISEASES.

The importance of blood-sucking insects and other animals as possible disseminators of pathogenic organisms being now universally recognized, it is absolutely essential, firstly that medical men and others engaged in improving the sanitation of tropical countries should have the means of determining correctly the names of blood-sucking species with which they may come into contact; and secondly that a well-preserved collection of modern specimens should be available in London for comparison.

The British Museum has already dealt with the mosquitoes and tsetse-flies, and it is now proposed to publish on similar lines a further series of monographs on the other blood-sucking forms. The material at present at our disposal, however, is insufficient for this purpose, and it is therefore hoped that all medical men and naturalists residing in British colonies, or in the tropics in any part of the world, will make special endeavours to obtain specimens and send them, addressed to the Director, British Museum (Natural History), Cromwell Road, London, S. W., together with notes on the names, habits, and distribution of the insects. This appeal is made especially to the medical officers of the Foreign and Colonial Services, to the medical officers of the Navy, Army, and Indian Services, and to all official representatives of H. M. Government in foreign parts.

The accompanying pamphlet, which has been prepared in order to assist those who may be willing to help the Museum in this way, is mainly devoted to the blood-sucking flies (Diptera), and contains a *résumé* of what is known of their appearance, habits, and life-history, with illustrations of typical forms and full directions as to the collection and transmission of specimens to England.

When a collection is despatched, a separate letter of advice stating the fact should always be sent; the expense of sending collections to the Museum, by parcel post or otherwise, will be refunded. All collections forwarded to the Museum and addressed as stated will promptly be acknowledged, and so soon as sufficient material has been obtained, the preparation of the first monograph will be commenced.

(Sgd.) E. RAY LANKESTER,
Director.

December 10, 1904.

TEMPERATE FLOWERS FOR WEST INDIAN GARDENS.

It may be useful for gardeners in the West Indies to have a list of flower seeds which have been tried in the West Indies. The following list, which is far from complete, has been supplied by a correspondent who has experimented with such seeds in St. Kitt's, and applies to heights of 100 to 700 feet:—

(a.) Plants which grow well with very little care:—

Abutilon	Petunias	Datura
Asparagus plumosus	Ricinus	Gaillardia
Begonia (fibrous rooted)	Sunflowers	Ipomoea grandiflora
Celosia	Tuberose	Marigold
Cosmos	Zinnias	Nicotiana affinis
Dolichos	Amaranthus	Portulaca
Gourds	Balsam	Solanum
Lantana	Canna	Torenia
Marvel of Peru	Coleus	Vinca rosea

(b.) Plants which require more or less special care in soil, shading, or manuring, and often do not succeed so well as in temperate zones, but have all flowered fairly well:—

Asters	Chrysanthemum	Nasturtium
Canary Creeper	(show varieties)	Everlasting flower
Carnation	Dianthus	Geranium
Cyclamen	Fuchsia	Heliotrope
Clematis	Gloxinia	Myosotis
Begonia (tuberous rooted)	Honeysuckle	Salvia splendens
Dahlia	Lavender	Sweet William
	Mignonette	Violets (Californian)

(c.) The following plants failed to flower, or flowered very poorly; all grew to some size from the seed (or bulb):—

Bermuda Lily	Sweet Peas	Pansies
Cineraria	Wall-flower	Primulas (Chinese florists')
Narcissus	Calceolaria	
Pelargonium (called in America)	Lady Washington geranium)	
Pentstemon	Gladiolus	Tulips

A New Spinach. When travelling in October last between New Glasgow and Halifax in Nova Scotia, Sir Daniel Morris came across 'Bay of Fundy Spinach,' a new dish recently introduced in the menu of railroad dinners. It has since been ascertained that this spinach is picked in the salt marshes in the neighbourhood of Sackville, New Brunswick. It is claimed as possessing the same qualities as asparagus and to be of a fine appetizing flavour. It is interesting to learn that it belongs to the plantain family and is the well-known *Plantago maritima* (sea-side plantain) of Europe.



GLEANINGS.

A sample of lemon grass oil was recently sent from Montserrat to brokers in London, who valued it at 4 $\frac{3}{4}$ d. They asked for a shipment of 500 lb., which they thought might be disposed of readily.

A three-weeks' course of lectures for operating distillers and managers in direct control of distilleries was held at the Government Laboratory in Jamaica from October 23 to November 13. This is the second course of the kind held in Jamaica.

The Imperial Department of Agriculture has been asked to supply the Queensland Department of Agriculture with seeds of superior sorts of star apples and custard apples. The Commissioner would be glad if any one having trees of really good kinds of these fruits would forward seeds.

The exports of sugar from Barbados during the period January 1 to November 5, 1906, amounted to 49,864 tons, as compared with an output of 41,043 tons during the same period of 1905. Similar figures for molasses are 61,036 puncheons and 38,653 puncheons, respectively.

The islands of Zanzibar and Pemba furnish approximately 90 per cent. of the clove crop of the world. This year's crop will be a small one, due to extremely heavy rains in Pemba, which usually furnishes about 65 per cent. of the yield. The experts estimate a crop of 8,571 lb. (*U. S. Consular Reports.*)

For the information of intending planters of the Central American rubber tree (*Castilloa elastica*) it may be mentioned that seed is not available until April. Those persons desirous of obtaining seed are requested to place orders with the local officers of the Department in the several islands early in the year.

The *Maritime Merchant*, of October 4, describes the display of molasses shown by the Dominion Molasses Company at the Halifax Exhibition. In large glass jars were shown quantities of the principal grades of molasses. In this collection there was practically a sample of molasses produced in each of the West India Islands, which was of interest as showing the various grades and qualities.

The *Jamaica Daily Telegraph* announces that an important scheme is on foot for the establishment of a large coffee factory in mid-Clarendon. 'At present a very large quantity of coffee is grown by the peasantry of upper- and mid-Clarendon, but, owing to the unskilled preparation of the produce for the market, they have not been able to make the business a success.'

The Agricultural Superintendent at St. Vincent announces for the benefit of growers of Sea Island cotton that the usual proportion of lint to seed-cotton is at the rate of 23 lb. to 26 lb. of the former to every 100 lb. of the latter. Unless the cotton is thoroughly dried and well picked beforehand, there is usually a loss in ginning ranging from 2 lb. to 5 lb. per 100 lb. of seed-cotton.

The imports of bananas into the United States for the eight months ending August 1906 were of the value of \$8,621,974, as compared with \$7,447,144 during the corresponding period of 1905. The countries contributing are: Central America, \$3,786,981; British West Indies, \$2,957,523; Cuba, \$1,149,056; South America, \$309,404; other countries, \$419,010.

Messrs. W. W. Gordon & Co., of Savannah, report on November 2: 'While the crop is moving, planters should carefully select seed from the best and most vigorous stalks for planting purposes next spring. We strongly urge the importance of this course upon those who desire to keep up the quality of the staple of their cotton. Bales with extra length or strength of staple command a premium.'

In reference to the consignment of 'millions' by the Imperial Department of Agriculture for the Titchfield Hotel, Jamaica (see *Agricultural News*, Vol. V, p. 268), the Secretary of the Jamaica Agricultural Society, at whose request the fish were sent, writes that the tanks at the hotel are now full of them. He also states that he had been informed that 'there has been a marked diminution of fever round about, the "millions" evidently accounting for the mosquito larvae.'

Mention was made in the *Agricultural News*, Vol IV, p. 377, of the fact that a trial of Jamaica tobacco was being made in the navy. The Jamaica Board of Agriculture has been informed by Mr. F. V. Chalmers, the tobacco expert, that 'the blend of Jamaica and Virginia tobacco which had been used experimentally in the navy would probably be found suitable, and when the experiment was completed they would probably want as much as 500 quintals of the third quality at a cheap rate.'

The Governor of the Canal Zone, Isthmus of Panama, has written to the Government of Jamaica, intimating that in consequence of the high prices and scarcity of vegetables on the Isthmus, he is desirous of securing quantities of fruit and vegetables from Jamaica. It is possible that Barbados, whence there are occasional direct opportunities for Colon, might also participate in this trade. It may be stated that during the year ended March 31, 1906, vegetables were exported from Jamaica to the republic of Panama to the value of £5,854.

Messrs. Henry W. Frost & Co., of Savannah, report in regard to Sea Island cotton on November 3, as follows: 'Factors being very firm in their prices, an advance of 1c. was paid, taking the entire offerings of odd bags at fine, 28c.; fully fine, 29c.; extra fine, 31c. The receipts are small owing to the shortness of the crop, and the market is very firm with an effort on the part of factors further to advance prices. The receipts are composed largely of parts of crop lots which are being held for very high prices, say, 35c. to 40c. for fully fine to extra fine, 50c. for extra fine, and 55c. to 60c. for full extra fine. One crop of 70 bags, classing extra fine, was sold this week for 50c.'

SCIENCE NOTES.

Germination Retarded by Seed-coats.

In a valuable paper on the 'Rôle of Seed-coats in delayed Germination,' in the *Botanical Gazette* for October, Mr. W. Crocker has shown that delayed germination is often due to the seed-coat rather than to the embryos.

A thin seed-coat, which lets in enough water, may keep out air so well that the embryo cannot get enough to breathe, and so cannot grow until the shell has decayed enough to form a hole through which air can pass.

Mr. Crocker records many experiments with the cockle bur (*Xanthium*), which is covered with little hooks and contains two seeds, an upper and a lower. In the upper seed the delay (of two years) is secured by the seed-coat excluding oxygen.

If a seed were accidentally wounded in removing it from the bur, it began to grow just where it was cut. If the wound were at the upper end of the seed-leaves, away from the radicle, the growth of the seedling was the reverse of that usual with the plantlet in seeds, in which the radicle usually grows out first. In this case the seed-leaves grew out first.

On removing the delicate seed-coats from the seeds of a cockle bur (*X. canadense*), both upper and lower seeds germinated equally and fully in nine days at about 68° F. All other kinds of cockle bur experimented with gave similar results. Hence it was the delicate seed-coat that caused the upper seeds to wait so long before germinating.

It was found that at 74° F. the lower seeds took up about one and a half times as much oxygen, when the seed-coats were removed, while the upper seeds took up nearly two and a half times as much oxygen when the seed-coats were taken off. And this difference between the two kinds of seeds would be greater when the seed-coats were thoroughly wetted, which was not the case in these experiments. Hence the seed-coat of the upper seed was a much greater hindrance to the passage of that part of the air which is essential for breathing than the seed-coat of the lower seed. Mr. Crocker also found by direct experiments on a seed-coat, that oxygen passes through it one and a half times as fast at 81° F. as at 68° F. Hence the fact that a higher temperature causes the upper seeds to germinate quickly is explained. At the higher temperature the seeds with the seed-coats on absorbed proportionately less oxygen which they did not give out as carbon dioxide.

From all these carefully worked out experiments a full understanding of the delay of the upper seed in germination can be reached. Enough oxygen gets through the seed-coat of the lower seeds to start them germinating. The part of the bur covering the upper seed does not easily decay, and so the seed-coat of the upper seed lasts usually for two years, and sometimes for three or four years, and until this seed-coat is broken through by rotting, the upper seeds will not germinate. The experiments proved conclusively that the cause of the retarded germination lies not in the embryo but in the seed-coat.

Mr. Crocker extended his work to many other seeds. It tends to explain the appearance of quite strange plants and flowers on a patch of forest cleared by fire, a fact noticeable in the forests of England and the United States. It would be interesting to know if any strange plants appear on the spots in West Indian forests where charcoal burners have been at work.

Distribution of Winged Seeds.

It is well known that many seeds are provided with wings for the purpose of securing their distribution by the wind. The mahogany affords a good example of such winged seeds. An examination of these shows that there are often provisions for securing that the seeds shall be blown as far as possible from the parent tree.

It may not have been noticed that the mahogany seed, as it descends from the opened capsule, rotates rapidly. It thus forms what may be termed a 'vegetable aeroplane,' the rotation evidently serving to retard to a considerable extent the rapidity of its descent. On examination the wing is seen to be curved like the blade of a screw propeller. The retardation is the same as that which would be experienced if a sailing ship, with auxiliary steam power, were to use her sails alone, without unshipping or feathering her screw. In a wind this vegetable gliding plane would be blown further from the tree, when a gust had dislodged it from the capsule, than if it merely had a flat wing.

Another tree, *Triplaris*, to be seen in some of the West Indian Botanic Stations, has three bent wings, forming a more perfect screw propeller to keep it flying in the air as long as possible.

DEPARTMENT NEWS.

The Imperial Commissioner of Agriculture returned from Canada and landed at Barbados on Friday morning, November 9. The following are the dates of his tour in the Northern Islands: Nevis, October 14 to 18; St. Kitt's, October 19 to 24; Antigua, October 25 to 27; Dominica, October 28 to 31; Montserrat, November 1 to 3; St. Lucia, November 4 to 7; St. Vincent, November 8. In addition to the official inspection of the Botanic and Experiment Stations and of the Agricultural Schools at Dominica and St. Lucia, public meetings were addressed at Nevis, St. Kitt's, Antigua, Dominica, Montserrat, and St. Lucia, and conferences with members of the Agricultural Experiments Committees took place at Dominica and St. Lucia.

The Hon. Dr. Francis Watts, C.M.G., Government Analytical and Agricultural Chemist and Superintendent of Agriculture for the Leeward Islands, who is on vacation leave of absence, is expected to embark for the West Indies at Southampton in R.M.S. 'Orinoco' on November 21, which is due at Barbados on December 4 next.

Mr. H. A. Ballou, M.Sc., Entomologist on the staff of the Imperial Department of Agriculture, left Barbados for St. Lucia in the S. S. 'Orinoco' on November 10, for the purpose of investigating insect pests of cacao in that island.

Mr. Thomas Thornton, A.R.C.S., Travelling Inspector in connexion with Cotton Investigations, returned to Barbados from the Northern Islands in R.M.S. 'Eden' on Monday, November 5. Mr. Thornton left for St. Vincent on November 6, to assist with experiments in seed selection of cotton.

THE ECONOMIC USES OF THE PALMS.

The following is a summary of a paper read by Mr. W. R. Buttenshaw, M.A., B.Sc., Scientific Assistant on the staff of the Imperial Department of Agriculture, before the Barbados Natural History Society on October 17, 1906:—

No natural order of plants, with the exception of the grasses, is of greater importance to man in tropical countries than this princely family, which supplies him with food, drink, clothing, and building materials. The Chaldeans, several thousand years ago, are said to have been indebted to the date palm for their food, clothing, wine, and timber for their houses. In Porto Rico to-day, the natives use the royal palm (*Oreodoxa regia*) for almost every possible purpose, from the siding of a house to the body of a saddle.

Of food products, palms yield edible fruits, wine, sugar, starch, and oil. The food found in a palm is stored up by the plant for further use. In the seed it is for the plantlet, when it begins its growth, as in the cocoa-nut. In the fruits it is to attract animals to scatter the seeds, as in the date. In the stem, it is stored to enable the palm to produce rapidly a great mass of flowers or fruit, as in the sago palm, which takes fifteen years to produce the first flower-spike.

OIL-PRODUCING PALMS.

Oil is the principal food product yielded by palms, and is produced chiefly by the cocoa-nut (*Cocos nucifera*), the oil palm (*Elaeis guineensis*), and the cohune nut (*Attalea Cohune*). The oils from the two former are very largely employed in soap and candle making. While the cocoa-nut palm is widely distributed throughout all the tropical regions, the oil palm is practically confined to West Africa. Since 1840 the trade in both these oils has largely developed through their use in the manufacture of candles.

The cocoa-nut is the most important of all the food-producing palms. Cocoa-nut oil is obtained by boiling and pressing the white kernel of the nut. In addition to the use of the oil in the manufacture of soap and candles, the nuts and oil form a large proportion of the food of the natives of many tropical countries. The milk affords a most refreshing beverage. The many articles which can be made from the hard shells are familiar to all. From the fibrous husk the useful fibre known as coir is obtained; this is chiefly used in the manufacture of cocoa-nut matting. Many other articles of minor importance are also made from it. From the outer portion of the trunk is obtained an extremely hard wood used in the construction of houses and furniture. It is known in England as porcupine wood, and is chiefly used for inlaying. Of late years a new product of the cocoa-nut has been appearing on the market as a substitute for butter. This is known as cocoa-nut butter or 'nucoline,' also as 'vegetaline.'

The cocoa-nut industry is now one of great importance in many tropical countries; notably, Ceylon and the Seychelles. In the West Indies, Trinidad and Jamaica have extensive cocoa-nut plantations, from which large numbers of cocoa-nuts are shipped annually to the United Kingdom and the United States. Most large plantations now have drying apparatus by which the white 'meat' can be converted into copra. Some have also oil-pressing machinery for the extraction of cocoa-nut oil. After the expression of the oil there remains a cake (poonac), which, like other oil cakes, is useful as a manure.

Palm-nut oil is the product of *Elaeis guineensis*, which is very abundant in West Africa, whence it has been introduced into the West Indies. It produces dense heads

of small, orange-yellow fruits about the size of an olive. The oil is obtained from the pulp of the fruits by boiling them in water and skimming off the oil as it rises to the surface. Commercial palm oil is usually about the consistence of butter, of an orange-red colour, with a pleasant odour of violets when fresh. In Africa it is used as butter. Palm oil closely resembles cocoa-nut oil in its chemical and physical characteristics. It has largely supplanted the latter in the manufacture of the cheaper kinds of soap. It is principally used in the manufacture of candles. Oil is also now obtained from the kernels which were formerly thrown away.

The cohune palm (*Attalea Cohune*) yields cohune nut oil. It is a native of Central America. Each fruit is about the size of an egg. The oil, which is used for illuminating purposes, is considered superior to cocoa-nut oil, but it is difficult to extract the kernel from the hard shell.

DATE PALM.

The date palm is a handsome palm, 60 to 80 feet high, found through Northern Africa, India, and south-eastern Asia. Its tall, straight trunk, covered with the scars of fallen leaf-stalks, is surmounted with a tuft of feathery leaves. It has the male and female flowers on separate individuals, and, in its natural state, the female flowers are pollinated by the wind. Each female tree produces from six to twenty flower clusters, each of which gives rise to a bunch of dates. At the base of the stem a number of suckers arise, and by these off-shoots the tree should be propagated, rather than from seed. It yields fruit at five or six years, but does not come into full bearing for twenty to twenty-five years, after which it continues bearing for about 180 years. Trees in full bearing produce eight to ten bunches, each containing 12 lb. to 20 lb. of fruit. Egypt has about 4,000,000 trees, yielding annually about 5,000,000 cwt. of fruit. Tunis has about half that number. The exports of dates from the Persian Gulf region amount to about 30,000 cwt. annually.

BETEL NUT PALM.

The Areca or Betel nut palm (*Areca Catechu*) is a native of the Malay Archipelago. The seeds are chewed by the Malays, even by children. They are supposed to prevent dysentery and to promote digestion. They colour the mouth red. The seeds are sliced and rolled in betel pepper leaves with a little lime. In England they are manufactured into tooth powder.

SUGAR-PRODUCING PALMS.

Several palms produce palm sugar, the most important of which is the wild date (*Phoenix sylvestris*), which is much used in India for obtaining sugar. There are even regular plantations of it. The tree gives the full average yield of juice in its eighth year. In collecting the juice, the lower leaves of the branching head are stripped off to leave a denuded space about 1 foot long; from this a triangular piece of bark is cut out. As soon as the sap begins to run, a reed is fixed at the lowest point of the triangle to carry the juice to a pot suspended below it. The wound is renewed by cutting a fresh thin slice from time to time until it is exhausted. The juice is concentrated by evaporation in open pans. It is estimated that 100 trees will yield as much as 3,500 lb. of thick sugar per annum; also that the produce from an acre is equivalent to 5½ tons of muscovado sugar.

(To be concluded.)

EDUCATIONAL.

Agricultural Teaching in Trinidad.

In his annual Report for 1905-6, the Inspector of Schools in Trinidad (Mr. J. H. Collens) makes the following reference to the teaching of practical agriculture in elementary schools:—

During the year 1905-6, 195 schools were examined in practical agriculture, and of these, sixty succeeded in obtaining the highest award 'very good.' In the previous year, of 190 schools examined, fifty-four obtained the coveted award. The Assistant Inspectors are unanimous in their opinion that the work in this direction is of a progressive nature. That the youth of the present day are being taught to cultivate vegetables and flowers is in itself something, but it is not all. In many schools useful experiments are made, results noted, and habits of observation thereby formed which cannot fail to have an influence for good in after-life. The dominant idea in up-to-date education is to teach children to observe and to think, to be practical and useful—not mere automata. There is no sacrificing of old traditions in this; the 'three Rs' have still, and must continue to hold first place in our school curriculum, but to quote the English code, the main purpose of the public elementary school is 'to form and strengthen the character and to develop the children entrusted to it, and to make the best use of the school years available in assisting both boys and girls according to their different needs to fit themselves practically as well as intelligently for the work of life.'

Not a little of the success which has attended the teaching of practical agriculture in our primary schools is due to the useful expert advice given to teachers by the Agricultural Instructors when making their round of visits to the various districts, and in connexion with this I can only repeat my last year's wish that it were possible for these officers to devote more time to the schools.

The chemistry class, conducted at Tranquility Training School since 1903 for the students of that institution and of Nelson Street Roman Catholic Training School, is now held at the Government Laboratory, and during the year under notice, in addition to the students, several teachers of primary schools took advantage of the privilege afforded them of attending these lectures. As usual, copies of the *Agricultural News*, the *Bulletin of the Botanical Department*, and the 'Proceedings of the Agricultural Society' have been gratuitously distributed to head teachers of schools with gardens, to each of whom also a small selection of English seeds was given.

Agricultural Instructors in Jamaica.

In lieu of the former arrangement by which Messrs. Elder, Dempster & Co. were required to maintain a staff of instructors in connexion with the fruit industry in Jamaica, proposals have been agreed to by which the company now pays over to the Government the sum of £500 per annum towards the salaries and expenses of the agricultural instructors appointed by the Agricultural Society. In addition there are two instructors under the Board of Agriculture.

At a recent conference between the Board and the Instructors Committee of the Agricultural Society, the following recommendations were made, which have since received the approval of the Government:—

Mr. Cradwick for no. 1 district, St. Catherine, St. Mary, and Portland, with present salary and allowance.

Mr. Briscoe for no. 2 district, St. Andrew and St. Thomas, with present salary and allowance.

Mr. Palache for no. 3 district, St. Elizabeth, Manchester, and Lower Clarendon. Salary, £250.

Mr. Arnett for no. 4 district, St. Ann, Trelawny, Eastern St. James, and North Clarendon. Salary, £300.

An Instructor to be obtained for no. 5 district, Hanover, Westmoreland, and Western St. James. Salary not to exceed £250.

Agricultural Instruction in Barbados.

The Annual Report of the Barbados Education Board for 1905 contains the following reference to agricultural instruction:—

The standard of work in agricultural instruction was maintained during the year, and in connexion with this subject the Board are able to report that school gardens are better managed now than at any time since the addition of this subject to the curriculum. Through the kindness of Sir Daniel Morris, a grant of £10 was made from the funds at the disposal of the Imperial Department of Agriculture for the West Indies for the purchase of boxes, pots, etc., in which to grow seedlings and cuttings where suitable spots for school gardens could not be obtained.

The Board have expended this year the £20, granted them by the Legislature for the purchase of agricultural apparatus, in implements for school gardens, such as hoes, forks, buckets, etc. Enclosures of mesh wire have also been provided from the grant.

BRITISH GUIANA RICE INDUSTRY.

Several references have been made in previous issues of the *Agricultural News* to the very encouraging development that has been taking place in connexion with the rice industry of British Guiana. Its position was recently reviewed on p. 193 of this volume.

In their market report, dated November 10, Messrs. Wieting & Ritcher make the following reference to the prospects of the industry:—

We are in the midst of crop operations. The weather has been unusually favourable for the growth of the paddy, and is now just as favourable for reaping the crop. As expected from the increased acreage empoldered, say, over 20,000 acres, of which the bulk had been planted up with paddy, it was expected that the yield would be about 400,000 bags or 600,000 maunds paddy—milling about 150,000 bags rice of the usual weight—but it is quite impossible at the present time to say if this result will be obtained, as statistics from the various and remote country districts are both unreliable and difficult to get.

Town agents and shop keepers in the country are now buying up all the produce obtainable, milled and unmilled, at prices under present market value, for present and future use, and very little has so far come to town; there will be no quantity of rice going forward for export except small parcels in order to keep our new staple before the island people and have a ready market there in future when our crops shall be larger. The rice industry may now be considered as firmly established in the colony.

MARKET REPORTS.

London,—October 23, 1906. Messrs. KEARTON, PIPER & Co.; Messrs. E. A. DE PASS & Co. October 19; 'THE WEST INDIA COMMITTEE CIRCULAR,' October 23; 'THE LIVERPOOL COTTON ASSOCIATION WEEKLY CIRCULAR,' October 12, and 'THE PUBLIC LEDGER,' October 20, 1906.

ALOES—Barbados, 15/- to 60/-; Curaçoa, 18/- to 55/- per cwt.
ARROWROOT—St. Vincent, 2½d. per lb.
BALATA—Sheet, 1/5 to 2/-; block, 1/1 to 1/5½ per lb.
BEES'-WAX—£7 10s. to £7 17s. 6d. per cwt.
CACAO—Trinidad, 68/- to 75/- per cwt.; Grenada, 61/- to 66/- per cwt.
CARDAMOMS—Mysore, 11d. to 3/- per lb.
COFFEE—Jamaica, good ordinary, 42/- per cwt.
COTTON—Medium fine, 6.85d.; West Indian Sea Island, medium fine, 13d.; fine, 14d.; extra fine, 15½d. per lb. Prices paid 9d. to 11½d. per lb.
FRUIT—
GRAPE FRUIT—7/- to 10/- per box.
BANANAS—Jamaica, 5/6 to 6/- per bunch.
LIMES—4/6 per box of 200.
ORANGES—7/- to 8/6 per box.
PINE-APPLES—St. Michael's, 2/6 to 6/- each.
FUSTIC—£4 to £4 10s. per ton.
GINGER—Jamaica, 54/- to 75/- per cwt.
HONEY—Darkish liquid, 19/- to 19/6; yellowish to good white, 20/- to 27/- per cwt.
ISINGLASS—West Indian lump, 1/9 to 2/3; cake, 1/- per lb.
KOLA NUTS—2½d. to 6d. per lb.
LIME JUICE—Raw, 10d. to 1/2 per gallon; concentrated, £21 17s. 6d. per cask of 108 gallons; hand pressed, 2/6 to 2/9 per lb. Distilled Oil, 2/3 to 2/4 per lb.
LOGWOOD—£4 to £4 15s.; roots, £3 10s. to £4 per ton.
MACE—Fair to good pale, 1/5 to 1/6; fair reddish 1/3 to 1/4; dark, 1/2; broken, 1/1 per lb.
NITRATE OF SODA—Agricultural, £12 12s. 6d. per ton.
NUTMEGS—64's, to 68's, 1/3; 80's, 11½d.; 91's, 8½d.; 105's, 6½d.; 116's, 6½d.; 124's, 5¾d.; and smalls, 5d. to 5½d.
PIMENTO—Fair, 2¾d. per lb.
RUM—Jamaica, 2/2; per proof gallon.
SUGAR—Yellow crystals, 15/6 to 17/6 per cwt.; Muscovado, 9/9 per cwt.; Molasses, 11/- to 13/- per cwt.
SULPHATE OF AMMONIA—£12 to £12 2s. 6d. per ton.

Montreal,—September 14, 1906.—Mr. J. RUSSELL MURRAY.
(In bond quotations, c. & f.)

COCOA-NUTS—Jamaica, \$26.50 to \$28.50; Trinidad, \$25.00 to \$26.00 per M.
COFFEE—Jamaica, medium, 10c. to 11c. per lb.
GINGER—Jamaica, unbleached, 16c. per lb.
MOLASCUIT—Demerara, \$1.00 per 100 lb.
MOLASSES—Barbados, 26c. to 27c.; Antigua, 21c. per Imperial gallon.
NUTMEGS—Grenada, 110's, 18c. per lb.
PIMENTO—Jamaica, 6½c. per lb.
SUGAR—Grey crystals, 96°, \$2.50 per 100 lb.
—Muscovados, 89°, \$2.00 per 100 lb.
—Molasses, 89°, \$1.75 per 100 lb.

New York,—November 2, 1906.—Messrs. GILLESPIE BROS. & Co.

CACAO—Caracas, 16c. to 17c.; Grenada, 15c. to 16c.; Trinidad, 16¾c. to 17c.; Jamaica, 12¾c. to 14½c. per lb.
COCOA-NUTS—Jamaica, \$35.00 to \$36.00; Trinidad, \$34.00 to \$35.00 per M.
COFFEE—Jamaica ordinary, 8¼c. good ordinary, 8¾c. per lb.
GINGER—Dark scraggy root, 9c. to 10½c.; white to bright bold, 10¾c. to 13c. per lb.
GOAT SKINS—Jamaica, Antigua, and Barbados, 59c.; St. Kitt's, St. Thomas, and St. Croix, dry flint, 49c. to 51c.; dry salted, 36c. to 48c. per lb.

GRAPE FRUIT—Jamaica, \$2.00 to \$4.00 per barrel; \$1.25 to \$2.50 per box.
LIMES—No quotations.
MACE—No quotations.
NUTMEGS—85's to 90's, 17c.; 95's to 100's, 14½c.; 105's to 110's, 13½c.; 120's to 140's, 11c.
ORANGES—Jamaica, \$2.00 to \$2.25 per box; \$3.75 to \$4.50 per barrel.
PIMENTO—5¼c. per lb.
SUGAR—Centrifugals, 96°, 3¾c.; Muscovados, 89°, 3¾c.; Molasses, 89°, 3¾c. per lb., duty paid.

INTER-COLONIAL MARKETS.

Barbados,—November 5, 1906.—Messrs. T. S. GARRAWAY & Co., and Messrs. JAMES A. LYNCH & Co.

ARROWROOT—St. Vincent, \$4.75 to \$5.00 per 100 lb.
CACAO—\$14.00 to \$15.00 per 100 lb.
COCOA-NUTS—\$10.56 per M. for husked nuts.
COFFEE—\$10.50 to \$12.00 per 100 lb.
HAY—80c. to \$1.20 per 100 lb.
MANURES—Nitrate of soda, \$65.00; Ohlendorff's dissolved guano, \$55.00; Cotton manure, \$42.00; Cacao manure, \$42.00 to \$45.00; Sulphate of ammonia, \$75.00; Sulphate of potash, \$67.00 per ton.
ONIONS—Madeira, \$2.02 to \$4.00 per 100 lb.
POTATOS, ENGLISH—\$1.80; Nova Scotia, \$1.75 to \$2.01 per 160 lb.
RICE—Ballam, \$5.70 to \$6.25 per bag (190 lb.); Patna, \$3.00 to \$3.50; Rangoon, \$2.70 to \$2.75 per 100 lb.
SUGAR—No quotations.

British Guiana,—November 10, 1906.—Messrs. WIETING & RICHTER.

ARROWROOT—St. Vincent, no quotations.
BALATA—Venezuela block, 25c.; Demerara sheet, 38c. per lb.
CACAO—Native, 12c. to 13c. per lb.
CASSAVA—60c. to 72c. per barrel.
CASSAVA STARCH—\$5.00 per barrel.
COCOA-NUTS—\$10.00 to \$12.00 per M.
COFFEE—14c. per lb.
DHAL—\$4.60 per bag of 168 lb.
EDDOS—96c. per barrel.
MOLASSES—16½c. per gallon.
ONIONS—Madeira, 3½c. per lb.
PLANTAINS—20c. to 36c. per bunch.
POTATOS, ENGLISH—Nova Scotia, \$2.75 per barrel.
POTATOS, SWEET—Barbados, 96c. per bag.
RICE—Ballam, \$6.25 per 177 lb.; Creole, \$4.75 to \$5.00 per bag (ex store).
SPLIT PEAS—\$5.90 per bag (210 lb.).
TANNIAS—\$2.28 per barrel.
YAMS—White, \$2.00; Buck, \$2.64 per bag.
SUGAR—Dark crystals, \$2.50 to \$2.60; Yellow, \$2.60; White, \$3.60 to \$3.65; Molasses, \$1.50 to \$1.60 per 100 lb. (retail).
TIMBER—Greenheart, 32c. to 55c. per cubic foot.
WALLABA SHINGLES—\$3.00, \$3.75, and \$5.25 per M.

Trinidad,—November 10, 1906.—Messrs. GORDON, GRANT & Co.

CACAO—Ordinary, \$16.50; estates, \$17.00 per fanega (110 lb.); Venezuelan, \$16.00 to \$16.25.
COCOA-NUTS—\$21.00 per M., f.o.b.
COCOA-NUT OIL—75c. per Imperial gallon (cask included).
COPRA—\$3.90 to \$4.00 per 100 lb.
DHAL—\$4.50 to \$4.60 per 2-bushel bag.
ONIONS—\$2.00 to \$2.25 per 100 lb. (retail).
POTATOS, ENGLISH—75c. to \$1.25 per 100 lb.
RICE—Yellow, \$5.25 to \$5.50; White, \$5.60 to \$6.00 per bag.
SPLIT PEAS—\$5.60 to \$5.70 per bag.
SUGAR—Grocery, \$2.25 to \$3.00 per 100 lb.



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Sugar-cane Experiments in Barbados.

AT a meeting of the Barbados Agricultural Society, held on November 16, Professor d'Albuquerque and Mr. J. R. Powell presented a summary of the more important and

interesting results in connexion with the sugar-cane experiments carried on in Barbados under the direction of the Imperial Department of Agriculture for the West Indies during last crop season.

One of the most important branches of this work is to endeavour to obtain seedling canes which shall afford each planter the means of selecting a variety, which, under the conditions of soil and climate existing on his plantation, shall give him an average yield and profit substantially in advance of what he obtains at present with the standard variety, the White Transparent. To this end, during the past nine years, some 30,000 canes have been raised from seed, and these 30,000 varieties have been studied in the pot, in the field, and many of them in the chemical laboratory, in order to select, and afterwards propagate, the varieties which possess the most desirable agricultural and chemical characters. The main points to which attention has to be paid in this selection process are: germinating power, tonnage, resistance to disease and drought, richness and purity of juice.

In the season under review, the selected canes have been grown on eleven black-soil estates and two red-soil estates, representing every variety of soil and climate in sugar cultivation in the island. On the whole, the weather conditions during the season were fairly favourable.

Taking the average muscovado sugar yield of the chief varieties grown on black soils as plant canes for the six years 1900-6, the results show that, while White Transparent gave 5,221 lb. per acre, B. 208 gave 5,551 lb., B. 147, 5,634 lb., and B. 1,529, 6,578 lb. The increased value of the sugar per acre, compared with White Transparent, was: B. 208, \$4.29; B. 147, \$5.37;

B. 1,529, \$17.64. Taking together the average yields of plants and ratoons, B. 208 gave 4,271 lb. of muscovado sugar per acre, as compared with 4,023 lb. from White Transparent. In this case, the average increase of sugar and its molasses is worth \$3.25.

In red soils the results are more striking. The average yields of muscovado sugar per acre for plant canes were: White Transparent, 4,402 lb.; D. 95, 4,972 lb. (increase, \$7.41); B. 376, 5,296 lb. (increase, \$11.62); B. 208, 5,442 lb. (increase, \$13.52); B. 1,529, 6,200 lb. (increase, \$23.37); B. 1,566, 7,451 lb. (increase, \$39.64). Taking together the average results for plants and ratoons on red soils, we find: White Transparent, 4,284 lb.; B. 208, 4,683 lb. (increase, \$5.19); D. 95, 4,881 lb. (increase, \$7.76); B. 376, 5,119 lb. (increase, \$10.86); B. 1,566, 6,016 lb. (increase, \$22.52). It should be added that seedlings B. 1,529 and B. 1,566 have so far been in cultivation as selected seedlings for only three years and in few plots.

Among all the promising varieties grown on black soils, White Transparent came out seventy-fifth with 6,600 lb. of saccharose, while there are four varieties that have been cultivated for the same three years, but on fewer plots, that gave over 9,000 lb. of saccharose, worth \$24.91 per acre more than White Transparent. The following are taken from this list of varieties cultivated during the past two years in black soils: White Transparent, 6,603 lb. of saccharose per acre; B. 147, 7,368 lb.; B. 208, 6,981 lb.; B. 1,529, 8,308 lb.; B. 3,696, 9,499 lb.

In the red soils, the results, taking plants and ratoons together, are: White Transparent, 12,286 lb.; B. 208, 13,514 lb.; B. 376, 13,707 lb.; D. 95, 13,795 lb.; B. 1,566, 14,643 lb.; B. 3,412, 16,165 lb.; B. 3,390, 16,689 lb. These results are given to indicate which are the most promising varieties; the high-numbered varieties will not be recommended for cultivation until they have been further tested. They are therefore not available for distribution.

Dealing with the results for the *present year* only, the best yields, as plant canes in black soils, were given by D. 95, B. 1,529, B. 147, D. 1,438, B. 376, and B. 208, in the order named. In red soils, the varieties, grown as plant canes and ratoons, have come out in the following order: B. 1,566, B. 376, D. 95, B. 208, B. 1,529.

On the estate plots, in which seedling canes were compared with White Transparent on a larger scale, varying from $\frac{1}{2}$ acre to 5 acres, B. 147 and B. 376 fell short of White Transparent, which gave

6,084 lb. of muscovado sugar per acre; but B. 208, cultivated as plants on ten black- and red-soil estates, gave, compared with White Transparent, an increase of 754 lb. of muscovado sugar per acre, worth \$9.80.

Interesting results in connexion with the manurial experiments with sugar-canes were also put before the meeting. These were carried out at Dodd's Botanic Station and on six sugar estates situated in typical parts of the island.

On the motion of the Hon. Forster M. Alleyne, it was decided to adjourn the meeting for a fortnight in order to give an opportunity for a full discussion of the results placed before it by Professor d'Albuquerque and Mr. Bovell.

RUBBER ON THE IVORY COAST.

Since 1899 the rubber trade has been growing on the Ivory Coast, and the exports last year amounted to 1,158 tons, or rather more than was exported from the Gold Coast.

In an article in the *Quarterly Journal* of the Institute of Commercial Research, in the Tropics (September), Mr. E. Castaing gives the following information in regard to the rubber-producing plants of the Ivory Coast:—

Rubber is very abundant throughout the Ivory Coast. It is produced both by vines and by trees. Of the vines, the most notable are the *Landolphia owariensis*, the *Landolphia Heudelotii*, and a *Carpodinus*; among the trees one finds the *Manihot Glaziovii* or Ceara, the *Ficus elastica*, the *Hevea brasiliensis*, and the *Kickxia* or *Funtumia elastica*.

The *Landolphia* is distributed throughout the colony, but is found more particularly in the district of Bondoukou, in Baoulé, and in the neighbourhood of Kong. It is *Landolphia* which yields the best qualities of rubber, more particularly 'Red Niggers.'

The *Carpodinus* has been found by M. Chevalier near Bondoukou during a recent tour. It is a vine of 21 to 25 feet in height, giving a good rubber. The latex yielded by this vine closely resembles in quality that furnished by *Landolphia*.

Manihot Glaziovii is found at several points of the Ivory Coast, having been introduced into the country. Two tappings made, with a day intervening, by M. Chevalier, on a Ceara seven years old, measuring 30 centimetres diameter at 50 centimetres above the ground, and of about 25 feet in height, yielded 158 grammes of fresh rubber, which lost one-quarter of its weight in drying.

Heveas were sown in the garden at Dabou about six years ago, and have been distributed in certain parts of the colony which are periodically inundated. These *Heveas* grow with extraordinary vigour. Some of them measure as much as 44 feet in height, and are already bearing fruit. They have not yet been tapped.

The *Kickxia* or *Funtumia elastica* occurs throughout the greater part of the colony. It is, however, rare above the eighth parallel of latitude, and is not found as far as Bouna. It is from the latex of this tree that the natives prepare the rubbers known under the names 'lump' and 'cake.'

SUGAR INDUSTRY.

Seedling Canes in Queensland.

In the Forty-third Annual Report of the Queensland Acclimatization Society, it is stated that the Overseer of the society's gardens paid a visit to the north in August last for the purpose of obtaining sugar-cane seed. The following extracts from his report are of interest:—

Every assistance was given to facilitate my object in procuring seed of the best varieties of cane, which, we hope, will lead to a much greater improvement in sugar-cane than has hitherto been achieved. Unfortunately, my time was so limited this year that I could not carry out experiments with the crossing of canes. Nevertheless, selecting the seeds from the best varieties, and afterwards carefully selecting the plants, may lead to excellent results, although I believe the crossing to be the most expedient system in attaining the object desired by the society.

From the seed selected last year (1905) 150 plants are added to our already large collection of seedlings, and for the first time we have planted seedlings in the field in the same year as raised from seed. All our seedlings this year, as on the previous occasions, are selected from the leading varieties, including two of the West Indian seedlings, B. 208 and B. 306. The crosses effected by hybridization in 1904 are making vigorous growth. However, as yet, nothing definite can be said concerning them, except that they are erect, nice-looking canes, similar in appearance to one another, but resembling neither of the parents, viz., B. 208 on Striped Singapore.

The number of seedling canes under test, and raised by the society, growing at Lawnton this year, is 567. Every cane is being tested as a field cane—first as 'plant,' then as 'ratoon,' and observed as to colour, mode of growth, length of joint, number of canes to stool, average weight per acre, time in maturing, general appearance of foliage, etc. Seedlings giving a good average in the above tests are sent on to the Chemist for analysis.

Demerara Seedlings and Gulf Storms.

Discussing the effect of storms on growing canes, the writer of an article in the *Louisiana Planter* (October 6, 1906) states that 'in most of the cane-growing countries the prostration of the canes before harvesting is probably the rule, and the harvesting of erect cane fields the exception.' Tropical cane growers can wait for the maturing of their blown-down canes, while the planter in Louisiana is compelled to harvest them, green or ripe, to save them from winter frosts. When the common red or striped canes of Louisiana are blown down, a new growth of roots starts from every joint, thus causing a delay in ripening. For example, in 1877, a September storm was followed by a severe November freeze, with the result that about half the crop was lost.

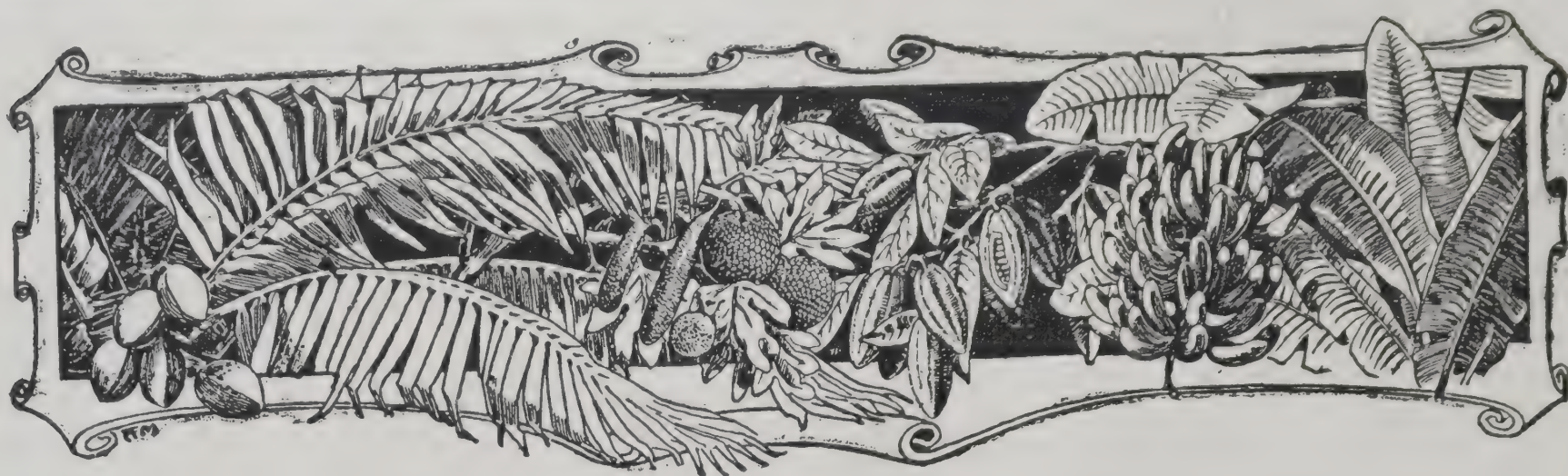
The D. 74 cane, though not blown down in the storm of last September, was bent over, and in the exposed places the tops of the stalks were broken off. In a more severe storm this would cause a greater loss than if the canes were prostrated like the Louisiana varieties.

Demerara seedling No. 95, on the other hand, was bent over but did not break; it went through the severe and protracted ordeal in the most satisfactory manner.

AGRICULTURAL EFFORTS AT DOMINICA.

In an article on 'Lime Growing in Dominica,' contributed by Mr. W. J. Davis to the *Demerara Argosy*, of November 3, the following extract deals with the work of the Agricultural Department in that island:—

Dominica has to thank the Imperial Department of Agriculture for the change in its prospects, and it would be difficult to find any place which owes so much to that Department as the island does, for the Botanic Station established by the Department has been, and is, the nursery of the lime industry. Fifteen years ago an abandoned cane-piece, situated partly at the base of, and partly on, a steep mountain side behind the town, flanking the Roseau valley, was taken over by the Department for the establishment of a Botanic Station, while, later, another piece of land, higher still, was taken over for the purpose of establishing what promises to be a highly successful agricultural school, and its care was given into the hands of Mr. J. Jones, a gentleman who received his training at Kew. Under the scheme framed for the control of the garden, it was arranged that the local authorities should gradually take over the cost of maintenance. At the present time the Imperial grant-in-aid of the Botanic Station amounts to £590 annually, while a further annual grant of £500 is made for the upkeep of the Agricultural School, the local contribution towards the maintenance of the botanical labour amounting to £500. The station is really the child of Mr. Jones. Under his care the various experiments have been conducted, and he is personally acquainted with every step forward which has been made. Under his supervision the station has developed into an institution, the usefulness of which to the island cannot be over-rated, and can be estimated only to a certain extent by the fact that, although the list of applications for plants opens in January and is closed in February, over 100,000 plants are distributed in the course of the year. Of course, the plants sold or distributed principally consist of young lime trees, but many other useful experiments are being carried out by Mr. Jones. At the time of the writer's visit he was engaged in an important grafting experiment with cacao, which, if successful, should be of the greatest value to those islands where cacao is the staple product, as it will, by taking grafts of the strongest and most prolific trees, enable a greater uniformity in the crop to be obtained, and the value will consequently be increased. Rubber is also being experimented with, but, as it is with the cacao experiment, greater benefit will in all probability accrue from them to other communities than to Dominica, the land suitable for cacao, for instance, only occurring in small patches in the existing cultivated area of the island. Applications for rubber plants and seeds have been received from other islands, and Mr. Jones has now a thousand plants for distribution. It is also through this gentleman's efforts that it seems likely that another branch of the lime industry will be established in the island: the manufacture of citrate of lime. In carrying out this particular experiment, Mr. Jones has proceeded on the rule of the camp, and utilized the tools he has at hand. An old cacao drier has been turned into a lime drier, while motive power for the fan which draws the heated air through the various compartments is provided by a small Merryweather steam fire engine. The results so far have been excellent, and will doubtless lead to suitable plants being erected on the estates, and by the direct manufacture of citrate of lime the cost of the condensation of citric acid for export will, to a large extent, be saved.



WEST INDIAN FRUIT.

COCOA-NUTS IN THE MALAY STATES.

In his report on a visit to the Federated Malay States (see *Agricultural News*, Vol. V, p. 323), the Hon. Staniforth Smith, of the Parliament of the Commonwealth of Australia, deals at some length with the cocoa-nut industry. The following information is extracted from this report:—

The area under cocoa-nuts in the States is estimated at 86,000 acres, the plantations lying chiefly along the west coast, as the trees yield best when they can taste the sea. In 1904, 976 tons of copra were exported—an exceedingly small return for the area planted. This is to be accounted for by the fact that the trees in the great majority of the plantations are just coming into bearing. With the present area in full bearing, the export of copra should be something like 43,000 tons, or $\frac{1}{2}$ ton to the acre, as the yield of the trees in the Peninsula is heavy.

The trees begin to yield in five years, and are in full bearing when eight or nine years old. A full-grown tree should yield sixty nuts a year, and with fifty planted to the acre, that area will yield 3,000 nuts, or $\frac{1}{2}$ ton of copra, worth £5.

An idea of the value of a cocoa-nut plantation in the Malay States can be gained by the report issued by the Inspector of Cocoa-nut Trees, in which he records the sale of a plantation of trees just coming into bearing at £30 per acre.

A factor of great importance in connexion with the copra industry is the absence of large fluctuations in the price of the product, and the remote probability of there being a serious slump in prices, as the demand for the oil is almost unlimited. One of its principal uses is for soap manufacture, and as the price of cocoa-nut oil is very little more than that of the best tallow, the demand is not at all likely to fall off.

Cocoa-nut trees in the Peninsula have suffered considerably from the attacks of the cocoa-nut beetle, and this evil assumed such proportions, owing to the carelessness of the native cultivators, that the whole industry was jeopardized. To cope with this danger, 'The Cocoa-nut Trees Preservation Enactment' was passed, and an inspector appointed. Plantations were regularly inspected, the rubbish which had been a breeding ground for the beetles was collected and burnt, diseased trees were destroyed, and plant sanitation was rigorously enforced. The Act endowed the inspector with powers to enforce his decisions; if the cultivator refused to obey instructions, the work was done at his expense, and the owner punished. This wise and firm treatment has rehabilitated the industry and placed it on a sound basis.

PINE-APPLE INDUSTRY IN THE BAHAMAS.

It appears from the *Annual Report* on the Bahamas for 1905-6 that energetic action is necessary to revive the colony's pine-apple industry.

There was a decrease in amount of over 31,000 dozen, and in value of over £2,800, of fresh pine-apples exported from the colony, as compared with 1904. The exports of preserved pine-apples were 64,606 cases, as compared with 65,159 cases in 1904, valued at £11,713 and £13,033, respectively.

The factory of J. S. Johnson Co. in Nassau canned 51,302 cases, containing 162,118 dozen pine-apples. This is an increase of some 9,000 dozen fruit over the previous year. At the three factories at Governor's Harbour, Eleuthera, 22,000 cases were canned, containing 84,000 dozen pine-apples.

The Resident Justice at Governor's Harbour reports that this industry is rapidly declining owing to the poor soil, the red spider, the want of a new stock of plants, and the use of unsuitable fertilizers. The Curator considers that the importation of fresh stock and the better selection of stock for planting purposes would materially help to revive the industry.

The Curator reports that large quantities are shipped in bulk in a green state to America, often arriving in bad condition and causing a heavy loss to shippers, and he is of opinion that all fruit should be canned here instead of being shipped in a green state.

LEMON AND ORANGE SYRUP.

The *Pharmaceutical Journal* gives the following 'Improved method of preserving syrup of fresh lemon or orange peel':—

Take 4 lb. of loaf sugar in large lumps, 7 gills of distilled water, an ounce of citric acid, and one lemon or orange. A lemon or orange with a good peel is selected, and this is rubbed on the lumps of sugar until the white portion becomes evident. Meanwhile, the citric acid is dissolved in the water; the sugar is broken up small and added to the acid liquid, which is then heated to boiling and strained, or it may be dissolved in the cold. The flavour of the syrup thus prepared is infinitely superior to that of the official (Codex) method. It keeps well.—Manseau (*Bull. Soc. Pharm. de Bordeaux*, 1906, 46, 200.)

TOBAGO STOCK FARM.

The illustration on this page, showing a view of the Tobago Stock Farm, is reproduced from Pamphlet No. 41, *Tobago, Hints to Settlers*.

The farm was started in 1899 with the idea of keeping improved animals for encouraging the breeding of first-class stock. The farm has since been worked as a branch of the Government Stock Farm in Trinidad. Since January 1905, it has been under the management of Mr. Henry Meaden.

As in the case of the Trinidad Farm, a feature of the farm is the annual sale of stock.

In the report of the Manager for the year 1905-6, it is stated: 'I am pleased to be able to state that the inhabitants have taken more advantage of the various stud animals that stood for service on the farm than in former years, and seem to be pleased with the results.'

In addition to cattle, sheep, pigs, a stallion and a donkey, poultry of various breeds are also kept at the farm.

The receipts for the year 1905-6 amounted to £491 11s. 3½d.; the expenditure was £1,051 6s. 9d.



FIG. 24. GOVERNMENT STOCK FARM, TOBAGO.

WAX FROM THE RAFFIA PALM.

The *Chamber of Commerce Journal* (November) gives an account of a 'new wax product' obtained from the raffia palm (*Raphia Ruffia*):—

It is reported that a product has recently been discovered in the leaves of the raffia palm which, by its chemical and physical properties, might be classed between wax and gum, and bids fair to become a valuable commercial commodity of Madagascar. The process of extracting the wax is simple. The natives who gather the raffia fibre generally pitch their camp in the neighbourhood of a raffia grove, to which they bring the leaves. The fibre is taken off, and the leaves are thrown aside in large quantities. The wax is collected by beating the dry leaves on a dry mat or cloth and gathering the pellicles and white powder which fall from them. Then, after boiling these pellicles and powder, the wax thus formed is kneaded into cakes of any form. This wax, which is very pure, will probably be more highly valued than bees'-wax, although yet an entirely new product.

Laboratory experiments have shown that raffia leaves give a theoretical yield of 16 per cent. of wax. The average production of wax would be about 100 grammes of wax for every kilogramme of fibre obtained. Supposing that raffia wax turns out to have a value about equal to bees'-wax, this means a yield of wax equal to three-fifths of the value of the raffia exported. Nothing is yet decided as to what may be the possible use to which this wax can be put. It might, perhaps, be utilized in the manufacture of bottling wax.

ARBOR DAY AT ANTIGUA.

Arbor Day was successfully observed at Antigua on November 9, the ceremony as in previous years taking place in both town and country.

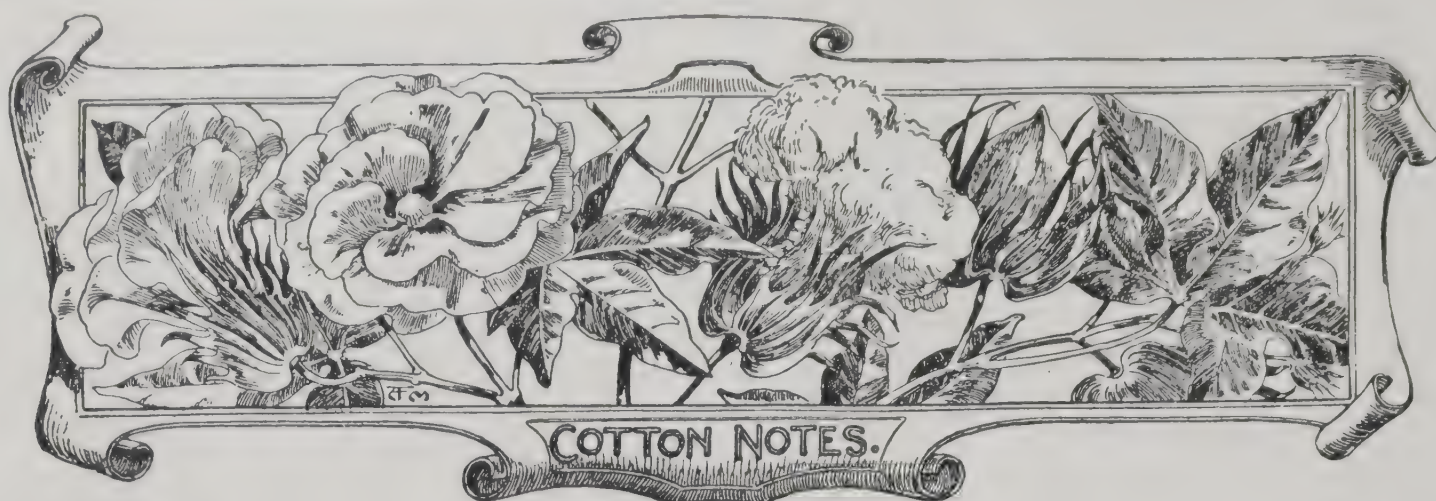
In St. John's, the ceremony consisted of the planting of a royal palm by his Excellency the Governor and Lady Sweet-Escott on each side of the approach to the bridge on the North Sound Road, leading to the Botanic Station. This was followed by the planting of sixteen mahogany trees by young ladies, along the bank on the side of the North Sound Road, continuing the Ladies' Avenue begun in former years. Trees were also planted by representatives of the High School

and Grammar School and of the various elementary schools in the town. Before planting the trees, his Excellency delivered a short address on the objects of Arbor Day.

In St. John's sixty-one trees were planted in all.

In all the various country parishes the day was celebrated in the customary manner by the planting of trees by various ladies and gentlemen and by the children of the elementary schools.

The movement appears to be firmly established in the island, a proof of which is the fact that a number of people observed the day by planting trees on their own behalf.



SEA ISLAND COTTON MARKET.

The 'Sea Island Cotton Report' of Messrs. Henry W. Frost & Co., of Charleston and Savannah, dated October 27, 1906, has the following:—

Islands.—The market was opened this week by the sale of all of the offerings of odd bags at 28c. for fully fine, and 27c. for fine. There was also some demand for crop lots, resulting in sales of four crops at 35c. to 40c.

Owing to the very unfavourable report of the probable out-turn of the crop, causing estimates to be reduced to about 9,000 bags, factors are very firm in their views, and are holding the small receipts of odd bags for 1c. to 2c. advance, and crop lots for their full asking prices.

CROP ADVICES.

The United States Census Bureau reports the amount of Sea Islands ginned to October 18, to be only 11,982 bags.

Total Crop.

The amount ginned in 1905 to same date	was 30,238 bags ...	123,870 bags.
" " " " 1904 to same date	was 31,691 bags ...	102,190 "
" " " " 1903 to same date	was 16,118 bags ...	76,409 "

Consequently, although this crop is reported to be a late one, the amount ginned to date this year seems to confirm all small crop estimates and encourages the planters to hold for very full prices.

ANTIGUA COTTON FACTORY, LIMITED.

This company has been incorporated, under the Companies Act (No. 20 of 1884) of the Leeward Islands, with a capital of £1,000, divided into 100 ordinary shares of £10 each. The following is extracted from the prospectus:—

1. This company has been formed for the purpose of buying out the interest of the Government of Antigua, as well as that of the British Cotton-growing Association, in the machinery, plant, etc., at present housed in the Government buildings known as the Cotton Factory, and to work it as a going concern from the first day of January 1907.

2. It is proposed to add to the number of gins to enable the company to deal with increased supply of seed-cotton. The directors have already imported two additional gins.

3. It is further proposed to erect a branch ginnery at English Harbour, should sufficient inducement be offered and suitable premises be secured.

4. The directors have also in view the question of:

(a) Buying seed-cotton from small growers.

- (b) Making advances to small growers of cotton to enable them to reap their crops.
- (c) Erecting machinery for crushing cotton seed for stock food and (if the industry develops sufficiently) for extracting oil from cotton seed.
- (d) And generally to carry on and develop the work which has been started by the Government for the benefit of the cotton industry of Antigua.

SEASONABLE NOTES.

Do not commence picking cotton too early in the morning, but wait until the sun has been up sufficiently long to dry the dew which has fallen in the night. Also, after a shower of rain wait until the sun has dried the seed-cotton before picking is resumed.

The double picking bag is proving to be most useful. The bag is hung round the picker's neck, and has in front a pocket attached, into which all stained cotton is placed. It has the advantage of enabling all stained cotton to be separated from the clean cotton directly it is picked. The bag should be 2 feet long and 18 inches wide. The pocket should be half the size of the bag, i.e., about 1 foot by 18 inches.

A very important feature in St. Vincent is the sorting of the seed-cotton. When it is brought into the house it is very carefully assorted, and nothing is allowed to pass as first class which is stained in the slightest degree.

On one estate in St. Vincent a very useful tray has been adopted for the use of the people when assorting seed-cotton. It is round, with a diameter of about 30 inches. The rim is made of wood, and the centre of a woven meshwork of fine cane. The tray is placed on the knee, and as the seed-cotton is thrown on to the tray it is spread out—a process which enables all the stained and undesirable seed-cotton to be easily picked out. The trays are made locally, and cost about 4d. each.

Sunning frames are this year being made by planters in all the West India Islands. These will be found to be of very great service, especially after such a wet season as has been experienced this year.

Unless the seed-cotton is well dried it is impossible to gin it properly, and such cotton realizes a much lower price on the market than cotton which has been perfectly ginned.

It would be well for planters to understand that it pays best when no pains are spared to put on the market a well-prepared product. The best possible price is paid for such an article, and spinners learn to look out for the same mark.

PARASITIC FUNGI.

Fungi may be classed roughly into three groups according to their mode of life. Some fungi obtain food materials for their existence from dead remains of plants or animals, and are known as saprophytes. Others feed only upon living plants or animals and cannot exist upon dead matter, and are called obligate parasites, while the third and largest group contains those fungi which are capable of feeding upon living plants or animals, or upon dead matter. The members of this last group of fungi are known as facultative parasites and are undoubtedly the most difficult to deal with, for they require most thorough and careful treatment.

The fungus that causes the root disease of the sugar-cane belongs to the last group, and, in the West Indies, has probably caused more damage, during the past few years, than all other sugar-cane diseases together. (See *Agricultural News*, Vol. III, p. 23.)

Sugar planters are familiar with the appearance of this disease in the field, where wilting and drying up of the leaves are probably its first signs. The old leaf-sheaths at the base of the stem, instead of being thrown off, are closely matted together by a white mycelium of the fungus *Marasmius Sacchari*. The fructifications of this fungus may frequently be seen in wet weather as small, white or yellowish 'toadstools' at the bases of diseased stools, and bear the spores which are capable of infecting other cane plants with the disease.

Canes that are growing vigorously and under favourable conditions are affected but little by this fungus, and some varieties of seedlings appear to be more or less immune from its attacks. For remedial measures, it is therefore desirable to pay particular attention to the cultivation of the soil in order that the canes may be increased in vigour; it is also necessary to destroy all infected material, the trash from infested fields not being used in cane fields or made into pen manure which is to be applied to canes.

In the *Agricultural News*, Vol. IV, p. 324, it is mentioned that in Trinidad a disease of bananas caused by *Marasmius semiustus* (a fungus closely related to that causing the root disease of sugar-cane) is prevalent on plants that are grown in unsuitable or impoverished soils. Diseased banana stems should not be allowed to remain and rot on the ground, but should be destroyed by being buried deeply with lime. Care should also be given to the choice of soils and to cultivation, etc.

Reference is made in the *Trinidad Bulletin of Miscellaneous Information*, for October 1906 (p. 133), to another species of *Marasmius*, viz., *M. graminum*, that has been found to be parasitic on the roots of grass from the lawns of Government House Gardens, Trinidad, and Mr. Hart suggests that this fungus may be equally responsible with the mole cricket for the disappearance of grass on lawns in Trinidad. This species is allied to *Marasmius oreades*, which often forms fairy rings on lawns in England. The latter is eradicated by forking, and applying a 5-per-cent. solution of sulphate of iron in water to the soil in the affected area.

The 'horse-hair blight' of tea in India and Ceylon is caused by *Marasmius sarmentosus*, and a very similar disease occurs amongst cacao in some of the West India Islands. The remedial measures suggested in each case are similar, viz., that all attacked trees should be pruned, and all the diseased prunings collected and burned.

It would appear, therefore, that the genus *Marasmius* contains many parasitic species which closely concern West Indian

planters, and more attention should be given to the small, insignificant 'toadstools' that are frequently noticed on the different plantations, and, until they have been shown to belong to fungi that are entirely saprophytic, they should be carefully destroyed, together with the plant remains to which they are attached.

POLLINATION OF COTTON.

Fear has been expressed from time to time that the best varieties of Sea Island cotton being grown in the West Indies might be contaminated through pollen being conveyed to the flowers by wind or insects from the wild cotton growing near.

Cotton pollen is, however, so heavy and sticky, that it is unlikely that it would be carried by the wind.

In regard to the possibility of cross-pollination being effected by the agency of insects, Mr. Herbert J. Webber, writing in the *Yearbook* of the U. S. Department of Agriculture (1902) on the 'Improvement of Cotton by Seed Selection,' says:—

'The cotton flower is large and attractive, and is much visited by bees and other insects, so that the pollen is carried from one flower to another in considerable abundance; hence in the beginning of the Department's experiments on cotton breeding it was supposed that the danger of cross-fertilization would have to be carefully avoided. However, the flowers are abundantly self-fertile, setting seeds normally when covered by paper bags that exclude all insects, and experience has shown that, while there is some crossing, the large majority of seeds that set are self-fertilized. In several instances, varieties have been grown in single rows with other varieties all around them of such a kind that crossing, where it occurred, could be easily detected in the progeny. Plants grown from seed, matured under such circumstances, show but few crosses, indicating that the majority must have been self-fertilized. Judging from the observations thus far made, it would seem that, ordinarily, only from 5 to 10 per cent. of the seeds are normally cross-fecundated. With cotton, therefore, it is not so important to grow the plants in an isolated location as in the case of corn. Nevertheless, practical experience has shown that when growers procure a small quantity of seed of an improved variety and grow this with other varieties to increase their stock of seed, usually the variety gradually deteriorates. This is probably due in considerable measure to cross-pollination with the ordinary cotton, though, also, doubtless in part to the fact that the seed received was probably highly selected, and deteriorated when selection was discontinued. While the effect of cross-fertilization is, therefore, not so great as in some plants, it is nevertheless of sufficient importance to justify certain precautions being taken.'

Observations made in St. Kitt's would seem to show that the honey bee is the only insect which visits the cotton flower; and further, that the way in which the bee invariably enters the flower precludes all possibility of crossing, for, pushing between the bracts and the corolla, the bee inserts its proboscis between the bases of two petals, and so entirely avoids touching the anthers or stigmas. On examination of cotton flowers it will usually be found that some of the anthers touch the stigmas, self-fertilization being thus ensured. It would appear, therefore, that, though the Sea Island cotton flower may be regarded as a source of honey, it is usually self-fertilized, and there is not much risk of deterioration being caused by insect pollination.

EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming, should be addressed to the Commissioner, Imperial Department of Agriculture, Barbados.

All applications for copies of the 'Agricultural News' should be addressed to the Agents, and not to the Department.

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Agricultural News

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NOTES AND COMMENTS.

The more important results of the sugar-cane experiments carried on in Barbados during last crop season are briefly reviewed in the editorial.

On p. 372 will be found information in regard to the cocoa-nut industry in the Malay States.

An illustrated note on the Tobago Stock Farm appears on p. 373.

The attention of cotton growers is drawn to the 'Seasonable Notes' on p. 374. These deal especially with picking and assorting seed-cotton.

A note on parasitic fungi (p. 375) shows that a number of serious plant diseases are due to fungi belonging to the genus *Marasmius*, the principal of which, in the West Indies, is that causing root disease of the sugar-cane.

An insect pest of cacao, known as thrips, is described on p. 378, with illustrations.

The Director of the Department of Agriculture in the Federated Malay States suggests the use of protective belts of jungle as a means of preventing the infection of cultivated crops by wind-borne spores of fungi (see p. 379).

The spiral system of tapping rubber trees is described on p. 381. This method has given good results with Para rubber in Ceylon.

A successful agricultural show was held at Montserrat on November 9 (p. 383).

Planting Enterprise at St. Lucia.

Considerable attention is being paid at St. Lucia to the planting of limes. There are at present seven plantations that are being planted in limes; one of these, started in 1902, is now shipping green limes. One planter hopes to get in 40 acres of limes by the end of this year. Consequently, there has been a large distribution of lime plants from the nurseries at Union and at the Botanic Station during the current planting season (April to October), the number being placed at 26,416. In addition, several estates are starting private nurseries for raising seedlings. It is estimated that the 54,600 lime plants distributed during the five years 1902-6 are sufficient to plant, at 12 feet by 12 feet, and allowing for losses, about 150 acres.

During the same period 5,793 plants of *Castilloa* rubber and 17,000 seeds were distributed. The plant distribution list also shows the following: cacao, 4,241; coffee, 989; nutmegs, 535; bananas (Canary), 450; and oranges (budded), 222.

Exports of the Bahamas.

The principal items of export from the Bahamas Islands are sponge, sisal hemp, pine-apples, and turtle shell. It is stated in the *Annual Report* on the colony that the total value of the exports in 1905-6 was £222,905, or £27,969 more than in 1904.

There was a satisfactory increase in the exports of sponge (from £105,718 to £113,753), while the output of sisal hemp increased from 2,218,825 lb. (value, £29,557) to 3,040,045 lb. (value, £37,522).

The exports of pine-apples, both fresh and canned, show a decrease. Grape fruit and oranges, however, were exported in greater quantity. The value of the exports of grape fruit was £2,397; of oranges, £1,388. The Board of Agriculture is considering means of providing a profitable market for these two fruits.

The estimated area of land under sisal cultivation is 20,412 acres. The output exceeds that of previous years, the fibre is better cleaned, and the acreage under cultivation is increasing, especially in the out-islands.

Exports of Turks and Caicos Islands.

According to the *Annual Report* on the Turks and Caicos Islands for 1905, the exports of salt fell in value to £14,604, as compared with £15,079 in 1904, which was considered the most disastrous year on record. The quantity of salt exported from the three settlements of the dependency was: Grand Turk, 110,475 bushels; Salt Cay, 361,412 bushels; Cockburn Harbour, 489,412 bushels; total, 961,299 bushels. The unusual rainfall was the cause of the two disastrous years for the main industry of Turks and Caicos Islands.

The chief subsidiary export is sisal hemp. The exports again fell in value, which was £5,803, as compared with £6,886 in the previous year.

Sponges were exported to the value of £2,223, as compared with £1,414 in 1904.

In connexion with the effects of heavy rainfall on the salt-raking industry, it may be of interest to give the following returns: 1905, 41.97 inches; 1904, 43.79

inches; 1903, 36.63 inches; 1902, 27.45 inches; 1901, 29.52 inches; 1900, 23.59 inches. The average rainfall for the previous seven years (1893-9) was 24.61 inches.

Gold Coast Agricultural Department.

The Annual Report of the Botanical and Agricultural Department of the Gold Coast, for 1905, records considerable progress in connexion with the promotion of agriculture.

In addition to the Botanic Gardens at Aburi, there are a Botanic Station at Tarkwa, an Experimental Cotton Farm at Labolabo, a Rubber and Kola Plantation at Aburi, and a Cocoa-nut Plantation at Christiansborg, while a site was chosen during the year for a Botanic Station in Ashanti.

From Aburi large numbers of plants and seeds were distributed. In connexion with this part of the work, reference may be made to the increased demand for seeds and plants of rubber, indicating a wide-spread interest in the cultivation of this product. 'The successful raising of 13,000 Para rubber plants for distribution is satisfactory; the seedlings will shortly be offered for sale at 1s. 6d. a dozen. There is no doubt that the demand will be in excess of the supply, and a larger number of seeds of this variety will be planted during the present year.' During 1905, 4,019 rubber plants and 1,362,962 seeds of various rubber trees were distributed from Aburi.

Experiments with rubber, cacao, citrus fruits, cotton, and other economic plants were continued. Valuable work is being done at the Experimental Cotton Farm.

A course of instruction in practical and theoretical agriculture was held at the gardens in June and July.

Ceylon Rubber Exhibition.

According to the *India-rubber Journal*, the rubber exhibition, carried out by the Ceylon Government in the Royal Botanic Gardens, was an unqualified success. It was the most complete rubber display the world has seen, and its results are expected to have a direct effect on the plantation industry throughout the tropics.

Two matters are referred to as the most noticeable features of the raw rubber sections of the exhibition. One is the superiority of 'block' rubber over the 'biscuit,' and the other the proof that the cultivation of Para rubber need not be confined to low levels.

The 'blocking' or compression of the rubber into a block has been shown to be economical in packing and shipping; it offers a much smaller surface to the risk of oxidization, and at the same time improves the physical properties of the product. It is anticipated that 'biscuit' making will now give place to 'blocking.'

The two samples of 'biscuits,' which between them won the Ceylon gold medal and the open gold medal, were grown at an elevation of from 2,500 to 2,700 feet, while the best sample of rubber from India was grown at an elevation of 3,500 feet. The growth of Para rubber at high elevations is an important matter, which is likely to receive much attention in Ceylon.

St. Vincent Agricultural Products Protection Ordinance.

This Ordinance, dated October 2, 1906, was framed to regulate the purchase of cacao, nutmegs, mace, and cotton, and to prevent thefts of these products. With a few exceptions, these products can be purchased only between stated hours and by licensed dealers, who have to keep records of their transactions, subject to inspection. Search of suspected premises is permitted, and persons found in possession of the above products and unable to give a satisfactory account of their possession of them, or persons purchasing the products from infants under twelve years, or trespassers on land where these crops are in fruit, are subject to penalties. Punishments are provided for those convicted of stealing or offering rewards to others to abstain from prosecuting or informing. A part of the fines may go to the informer.

Production of Rubber in Brazil.

In an article in the *Tropenpflanzer* (July) on the 'Rubber production of Brazil and its probable future,' it is stated that half of the world's supply of rubber now comes from the valley of the Amazon. The production of rubber from Para rubber (*Hevea brasiliensis*) does not increase sufficiently to account for the increase in the exports of rubber from Brazil, which is due to production from *Castilloa elastica*, *Sapium Marmieri*, *Hancornia speciosa*, and (in middle and south Brazil) maniocoba or Ceara (*Manihot Glaziovii*). The quality of these rubbers is inferior to that of Para. *Castilloa* rubber comes from the upper reaches of the Amazon and its tributaries, and already forms one-sixth of the total exports.

In the state of Matto Grosso the production of Para rubber is increasing on account of the exploitation of hitherto untouched forests. In the non-equatorial states the production of other kinds of rubber is increasing more rapidly.

In the states of Brazil, the chief sources of revenue are export duties. On account of the export duties on rubber, it does not appear likely that rubber plantations could succeed. It is shown that it costs 34 per cent. of the market value of the rubber to place it on board ship, and trial plantations have failed to pay on account of these duties.

Hevea planted out in the forests and uncultivated does not bear tapping until it is from fifteen to twenty-five years of age. As money in Brazil will realize 12 to 24 per cent., such a period of waiting would not pay.

The political considerations which lead to high and rising taxes on exports seem unchangeable. Hence other parts of the tropical zone, free from such imposts, will provide for the world's needs in rubber. If the price of the lower qualities of rubber should fall, it seems probable that Brazil's rubber export will follow its once flourishing exports of sugar and cotton, now extinct. Its coffee (subject to high export duty) was greatly injured by the late fall in prices. Its meat exports, too, have vanished, and it now imports from La Plata.



INSECT NOTES.

Thrips on Cacao.

For some years past a small insect called thrips (*Physopus rubrocincta*) has been known to occur on cacao trees in different parts of the West Indies.

These are small insects with slender bodies, the adults being dark-brown or blackish in colour, while the young are greenish or yellowish. Many of the young have a bright-red band across the abdomen. The accompanying illustrations (figs. 25 and 26) show the young and adult thrips, respectively.

The adults have four narrow wings which are fringed with hairs. They are able to leap and fly actively. The young resemble the adults in the shape of the body, but differ from them in having no wings, in being much lighter in colour, and in having the red band across the abdomen, which the adults do not have. Thrips are peculiar in their feeding habits, being rather intermediate between the biting insects and the sucking insects.

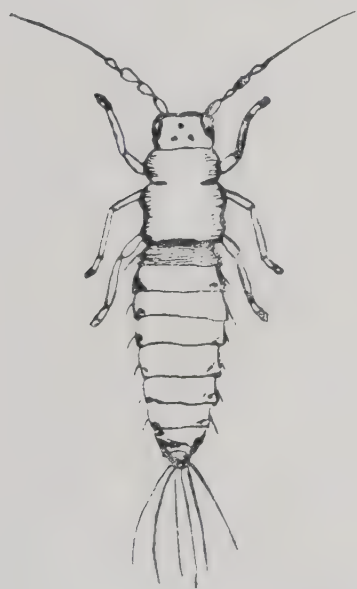


FIG. 25. YOUNG THRIPS.

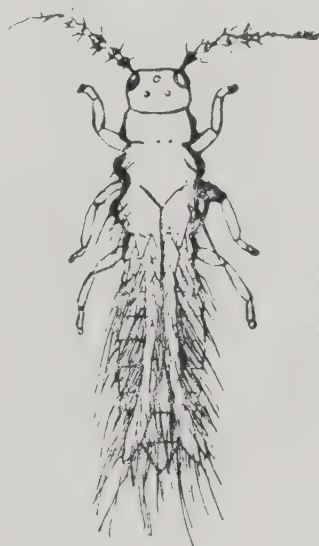


FIG. 26. ADULT THRIPS.

The young thrips are generally to be found on the under side of the leaves and on the pods. The leaves that have been attacked by thrips have a characteristic appearance, as if the lower epidermis and a portion of the interior of the leaf had been eaten away, leaving the upper epidermis and a portion of the interior. When this dries, the attacked areas are plainly to be seen. As the thrips generally occur in small groups or colonies on the leaf, there are sometimes to be seen only one or two small attacked areas, while in cases of severe infestation the whole under surface of the leaves shows the scarified or skeletonized appearance. On the pods the effect is perhaps even more noticeable than on the leaves. Pods that have been seriously attacked turn a deep russet- or mahogany-brown colour over the whole surface, while in cases of lesser infestation these colours appear in spots or blotches on the surface of the pod. The young thrips are often to be seen with the abdomen elevated in a threatening attitude, and at the tip of the abdomen a drop of brownish liquid. This liquid they deposit from

time to time on the leaves and pod and when it dries, a thin, dark-coloured flake remains on the surface of the leaf or pod.

There are two effects of a severe attack of thrips on cacao. One is a loss of the seriously attacked leaves and the consequent dying back of the tips of the branches, which is supposed to be due to repeated defoliation of the trees. The other effect is the discoloration of the pod due to the attacks of thrips, which renders it difficult for pickers to distinguish between ripe pods and the unripe ones that are discoloured. A considerable loss has been experienced from this condition.

The remedies to be employed against thrips on cacao are cultural methods, to put the trees in the most vigorous growing condition, and spraying with a contact insecticide. In Grenada, rosin wash is reported to have given good results.

A detailed account of this pest of cacao trees will be found in the *West Indian Bulletin*, Vol. II, pp. 175-90.

Food Plants of Cotton Stainers.

In a recent number of the *Agricultural News* (Vol. V, p. 314), information was asked for as to food plants of cotton stainers. Mr. A. W. Bartlett, B.A., B.Sc., Government Botanist for British Guiana, sends the following note in response to that request, and adds information in regard to the insect mentioned as a cotton stainer by Mr. Beckett in his *Hints on Agriculture* :—

The only species of *Dysdercus* I have found in this colony is *D. annuliger*, Uhler,* of which I am sending a pair per sample post by this mail to verify my identification.

It is everywhere plentiful on cotton, and other plants on which I have found it are *Eriodendron anfractuosum*, *Hibiscus tiliaceus*, ochro, sorrel (*Hibiscus Sabdariffa*), *Hibiscus Abelmoschus*, *Malachra capitata*, and *Sida* sp. It appears to have a wonderful instinct in discerning plants belonging to the natural order *Malvaceae*, and I do not remember finding it feeding or breeding on plants belonging to other orders. I notice that in the article on 'West Indian Cotton Stainers' in the *West Indian Bulletin* (Vol. VII, p. 84) is mentioned that 'in British Guiana, Beckett records a cotton stainer (*Dysdercus* sp.) which can readily be distinguished by a dirty whitish cross with two dark patches on the back.' On my recent visit to England I identified the insect which Mr. Beckett refers to at the South Kensington Natural History Museum as *Oncopeltus fasciatus*, Drury (Family *Lygaeidae*). Its real food plant is *Asclepias curassavica*, on which it is found abundantly in its various stages, of which the immature ones are red in colour and much resemble young cotton stainers, and it is possible that occasional examples of the mature insect may be found on the cotton plant.

Leaf-mould. Well-rotted powdery leaf-mould is needed in all cases where plants are grown in pots. It can be prepared in a month or two, in tropical countries, by making a pile of weeds, dead leaves, prunings, etc., in some out-of-the-way corner. In dry weather a little water may be thrown on it occasionally. Good leaf-mould can always be obtained by a spade from the bottom of this pile. The chief use of leaf-mould is to hold water. It also provides a small supply of nitrates and the other salts needed by all plants.

* Examination by the Entomologist on the staff of the Imperial Department of Agriculture of the specimens forwarded by Mr. Bartlett shows that this insect is not *Dysdercus* (*annuliger*) *delavneyi*. It has not yet been identified, but is more nearly related to the Trinidad species (*Dysdercus howardi*).

PREVENTION OF PLANT DISEASES BY PROTECTIVE JUNGLE BELTS.

In his report on the Department of Agriculture in the Federated Malay States for 1905, the Director (Mr. J. B. Carruthers) makes the following interesting reference to the use of protective jungle belts as a preventive of plant diseases:—

The prevention of the spread of disease in large areas of one species of cultivation is of first importance, and at the outset of the planting up of rubber in the Federated Malay States steps must be taken to guard, as far as can be done, by planting or leaving jungle and thus making barriers, against the too easy distribution of parasitic insects and of the spores of fungi which attack living plants.

That each estate should itself plant protective belts is, when large yields per acre are so much desired, perhaps too much to expect. Districts, however, can be to some extent divided off, so that the outbreak of disease in one locality may be confined within limits, and plantations in other parts may either be preserved from the evil or at any rate protected for a time, so that the preparations may be made to prevent or combat the attack on its first appearance.

I selected an area of about 16 miles long by 2 wide, running from the Buloh river in a south-east direction to the Klang river, and adjoining the Sungei Buloh forest reserve.

The direction of the prevalent winds is not sufficiently constant in Selangor to make the position of the protective belt in regard to points of the compass important. So much land had already been taken in Klang and Kuala Selangor districts that it was important at once to reserve the belt, and I selected this area chiefly because it included a series of bukits—i.e., small hills—and thus added to the height of the barrier, also because it included the water catchment area for Klang, which will remain in jungle, and adjoined the large forest reserve of Sungei Buloh, which thus forms a continuation eastward of the barrier. I hope to be able to record in future reports the continuation of this policy in other states, where immediate action is not so necessary, as comparatively small areas have as yet been alienated for rubber.

The value of such protective belts in tropical countries is not sufficiently recognized. In temperate climates the spread of fungus and insect pests is checked by the advent of winter, and even in the warmer months the rate of increase of diseases due to fungus or insect attack is much slower than in tropical countries. In a climate like the Malay Peninsula, the conditions for the spread of fungi are almost perfect. Moisture and heat are the essential factors necessary to the germination and growth of spores of fungi, and in Malay these conditions are present practically all the year round.

During the last six years in Ceylon, I have been carrying out experiments as to the wind distribution of spores, and had at various elevations and aspects in the planting districts of that island erected experimental 'tabernacles'—i.e., jute hessian screens, enclosing a space 48 feet by 8 feet broad, 9 feet high, and open to the sky. These screens were placed at right angles to the prevalent winds, and erected on tea fields just after the bushes had been pruned and before any leaves were produced on any bushes in the field. In Ceylon, the winds are approximately north-west and south-east, respectively, during half the year. The appearance of the leaf spot fungi on the leaves of bushes inside the tabernacle and on the windward and leeward sides, respectively, were carefully observed. These experiments showed clearly the value of a mechanical protection from the attacks of wind-borne spores. Other proof of the efficacy of such protective

belts can be got from observations of tea, coffee, and other crops near to jungle. A case clearly demonstrating this point was given in my annual report in Ceylon for 1901. On the windward side of a narrow strip of jungle at the brow of a hill, a field was badly blighted with leaf disease (*Pestalozzia guepini*, Desm.). A road 25 feet wide had been cut through the jungle, and on the leeward side was a field of tea, which, during the south-west monsoon, when the wind blew from the unattacked to the blighted field, showed no sign of disease. A short time after the north-east monsoon began to blow, the healthy field began to show signs of leaf blight, but only on the bushes near the road through the jungle. On burning a bonfire on the windward side of the jungle the smoke covered, during the half hour it was watched, practically the whole area that contained bushes attacked by leaf disease.

That such a protective jungle belt is a certain safeguard is not claimed, but that it must prevent a large amount of infection is certain. To insects, the barrier of jungle would be equally deterrent, and unless the insects acquired a liking for jungle foliage, the interposition of a sufficiently thick belt would effectively prevent their reaching rubber or other cultivations on the far side.

HOW TO GROW CHRYSANTHEMUMS IN THE WEST INDIES.

A correspondent in St. Kitt's has forwarded the following notes on growing show chrysanthemums:—

Young plants can be obtained from growers in England or America, about August. The growers usually pack them in the same way as for transport in temperate regions. This gives very bad results, all leaves and all young stems arriving in a rotten and mouldy condition. The growers should be instructed to pack as follows: Choose young plants which have formed woody stems; cut off nearly all the leaves and prune all the soft stems; wrap a very little wet sphagnum round the roots, and envelop the whole in about five loose folds of paper, some of which may be glazed, but not waxed. Do not use any box, and a paraffined box is the worst of all. If a box must be used, trust to paper wrappings for keeping moist, and cut the box full of holes.

When the young plants arrive, wash them well, cut off all rotten parts, and plant them in pots. It is best to put them first in small (thumb) pots in sandy soil, plunged in moist sand in a box. They should be in full sun, or protected by a lattice only. When they have produced new roots and leaves they may be transferred to 4- or 6-inch pots. These latter pots should have broken crocks covered with cocoa-nut fibre at the bottom, and the soil should be one-third sand, one-third loam, one-third leaf-mould thoroughly mixed, with a spoonful of basic slag (for volcanic soil) or superphosphate (for lime soils), and a spoonful of sulphate of potash. When the plant is well established a small pinch of nitre must be put on the top every few days, according to the needs of the plant. When the plant is established, it must be in full sunshine or under a lath lattice of alternate laths and spaces. The first buds are usually single (crown buds) and are generally best nipped off. When a cluster of buds appears, nip off all but the centre one (terminal). Do not leave more than two buds on the plant. Never water until the pot is fairly dry and then fill it to the brim. The pots are best plunged in the earth. When the one or two choice blossoms have appeared let the plant grow at random to provide cuttings. The cuttings root easily in fresh moist sand, and, like all cuttings, their growth is rendered more certain by dipping the ends in strong Bordeaux mixture.



GLEANINGS.

It is stated in the *Annual Report* on the Bahamas, where sisal hemp cultivation is the chief agricultural industry, that some of the local schooners now use home-made ropes and hawsers.

It is satisfactory to note that citrate of lime has become an article of export from Montserrat. It is hoped to publish further information in regard to the establishment of this industry in a future issue of the *Agricultural News*.

The Agricultural Superintendent in Grenada announces that a limited amount of seed of an improved Guinea corn is now available at the Botanic Station and can be obtained on application, at the rate of 3d. per lb.

The Manager of the Bath estate, Dominica, announces that the estate will purchase raw lime juice, for manufacture into citrate of lime, in any quantity on a basis of London prices for concentrated juice, less the cost of manufacture and other expenses.

The Dominica Permanent Exhibition Committee forwarded a consignment of fruit for the Royal Horticultural Society's Colonial Fruit Show, to be held in London on December 4 and 5. In all, forty-two crates and five barrels of fruit were despatched.

The Bavarian farmers note with satisfaction that mistletoe (*Viscum album*), formerly a dreaded parasite on apple trees, has been gradually decreasing by the use of it for Christmas decoration, a custom lately introduced into Germany. (*Consular Report*.)

The Agricultural Instructor at Nevis writes: 'The broom corn at the Experiment Station is now stripped from the brooms, and the latter are ready for disposal. I can spare some seed if any Botanic Station requires it. There is also available some seed of the red cow peas.'

Elsewhere in this issue of the *Agricultural News*, an account is given of the spiral method of tapping rubber trees, which has given good results with the Para rubber (*Hevea brasiliensis*) in Ceylon. Dr. S. Soskin (*Tropenpflanzer*, January 1906) recommends the adoption of the same method for tapping trees of *Funtumia elastica* in German West Africa.

With a view to obtaining definite and reliable results, attempts were made at the Royal Botanic Gardens in Ceylon to propagate Para rubber by cuttings. The net result was that at the end of the year not a single plant was obtained from the 3,000 cuttings, demonstrating the fact that, under the conditions at Peradeniya, at any rate, *Hevea* is not adapted to propagation by this means.

For carefully picked and thoroughly dried Sea Island cotton, free from leaves, trash, etc., the charge for ginning and baling at the St. Vincent Central Cotton Factory will be at the rate of 2c. per lb. of lint. The seed will be returned to the grower in the bags in which his seed-cotton was sent in.

The Curator of the Botanic Station in the Bahamas has been good enough to offer to give a course of teaching in the principles of agriculture to any teachers who may care to avail themselves of it during the summer vacation, and it is hoped that many teachers will embrace this opportunity. (*Annual Report*.)

According to the *International Sugar Journal*, the Peruvian Government has recently started a Sugar Experiment Station, which will be modelled, as far as possible, after the station of the Hawaiian Sugar Planters' Association. In addition to actual analytical and research work in the laboratory, field experiments will be started.

Under the authority of the 'Importation of Plants Diseases Prevention Ordinance, 1906,' the Governor-in-Council has prohibited the importation into St. Vincent of all plants, seeds, berries, etc., from Ceylon, Natal, South India, Mauritius, and the Straits Settlements; of all cacao plants or trees from South America, and of all portions of the banana plant from Trinidad and Tobago.

In regard to the storm that blew over St. Kitt's on September 1, it has been pointed out that every leaf of the sugar-cane for some distance inland, north-west of Basseterre, was killed by the spray; also a field of corn had every plant blown down. On the other hand, neither the Guinea grass, exposed on the edge of the cliff to the full blast, nor the larger cotton near the cliff was affected by this spray.

According to the report of the Government Chemist in Ceylon, since the publication of the pamphlet on the distillation of camphor from leaves and shoots, the planting of camphor trees has somewhat extended. Several distillations were made with shoots from estates at elevations ranging from under 2,000 feet to over 6,000 feet, the yields varying from 1.16 to 1.71 per cent. Leaves and twigs distilled separately showed that the ratio of the camphor content was about 3 to 1.

The Barbados *Weekly Illustrated Paper*, commenting on the probable lower yield of cotton in the island, mentions that this is stated to be due to the worm having been present in greater numbers, and also 'to the fact that those people who were anxious to put in large quantities of cotton did so without having carefully prepared the land. Disappointment, undoubtedly, will follow on such actions, and those who have been careful in preparing the land will, no doubt, reap a beneficial harvest.'

Mr. J. Jones writes: 'A very handsome flowering shrub growing in the Botanic Gardens, Dominica, has lately been identified at Kew as *Steriphoma paradoxum*, a native of Caracas. The clusters of unopened flower-buds are of a rich crimson colour, which later turn orange, and open just sufficiently for the yellow petals and stamens to protrude. The plant has not yet borne seed, and appears difficult to propagate by cuttings. It should prove a suitable plant for grouping in beds on lawns, as it flowers freely in a sunny position.'

SPIRAL METHOD OF TAPPING RUBBER TREES.

The first systematic arrangement of the cuts in tapping is the V system, with one cup at the apex of each V. By shaving the lower sides of the cuts the yield may be prolonged for some time, about two months continuously. This system leaves the bark rough when it heals, and the point of bark at the apex of the V often loosens and dies.

The second system is that known as the herring-bone, with a long vertical channel. The objection to the latter is that it decreases the tension of the bark and so diminishes the flow of latex. By shaving the lower side the yield may be continued till the upper side has completely healed.

The third system is the half-spiral which resembles the half-herring-bone, except that the cuts (1 foot apart) are carried half round the tree. There may be a vertical channel, or a cup may be used for each cut.

The full spiral method consists of two or more spiral cuts winding round the tree, a foot apart, at an angle of about 45° . This method is fully described in articles in the *Tropical Agriculturist*, 1905, pp. 308, 547, and 641. It is also compared with the other methods by Mr. Herbert Wright in his book on *Para Rubber*, which was reviewed in the *Agricultural News*, Vol. V, p. 257. The cuts are marked out by a zinc stencil and the first incision is made with the Bowman-Northway knife No. 1, which resembles a plane, and is so constructed that the operator can cease cutting deeper when the light white colour of the cambial tissues is seen. Knife No. 2 is used for paring the lower edge of the cut, for a fresh flow of latex. It is provided with a guard so as to prevent any incision of the cambium and will cut a shaving $\frac{1}{30}$ inch thick. It seems best to tap the trees on alternate days. If 1 inch were removed every two months, it would be two years before the lower edge of one spiral reached the healed upper edge of the next. By the use of knife No. 3, which has the form of a revolving wheel with sharp teeth, and is used for opening the latex tubes without removing any bark, the period may be prolonged to three years.

A great advantage of this system is that it leaves no untouched bark, and so, on healing, the stem is quite smooth and the process may be repeated indefinitely.

A drip-tin at the top of each spiral keeps the latex from coagulating in the cuts. At Deviturai, Ceylon, 248 trees, tapped by the V system, gave (in 1903) 240 lb. of rubber, the usual yield by this method on this estate. In 1905 the full spiral system, applied by its inventor, resulted in a yield of 1,317 lb. being obtained from the same 248 trees. An average yield of 16 lb. yearly was obtained by the spiral method from trees about twelve years old, and the foliage, seeds, and renewed bark, were perfectly healthy after tapping. The large yield and the perfect renewal of bark more than compensate for the extra labour required.

At Henaratgoda, Ceylon, twenty-five trees tapped on the full spiral system, from September 1905 to February 1906, gave $50\frac{7}{8}$ lb. of rubber; twenty-five trees of the same size, tapped at the same time by the half spiral method, gave $35\frac{1}{2}$ lb. of rubber, and twenty-five trees tapped on the full herring-bone gave $47\frac{5}{16}$ lb. The total amount of bark removed in the above experiment (full spiral) was only $1\frac{1}{2}$ to 2 inches. At Peradeniya four trees, twenty-nine years old, yielded 11 lb. $5\frac{3}{4}$ oz. in three and a half months by V cuts, though the yield fell off considerably. Four other trees, twenty-nine years old, yielded in the same time by spiral cuts 22 lb. 11 oz., and the yield did not fall off so much.

PREVENTION OF ANTHRAX IN ST. VINCENT.

The following is the substance of a notice recently issued by the Government of St. Vincent:—

Persons owning or in charge of animals becoming sick or dying, or which are found dead, who are guilty of neglect to report the deaths are liable to a fine not exceeding £100. The police have strict orders to prosecute such persons, while a reward of 5s. will be paid to any person who gives information which results in the conviction of such persons.

The present steps are taken by the Government purely in the interest of stock-owners to arrest, as far as possible, the disease of anthrax, and assist in opening the markets for St. Vincent stock, and all persons interested in this are invited to assist the Government by bringing to light any breaches of the regulations, which are liable to do much harm.

THE INFLUENCE OF VOLCANIC ASH ON CROPS IN ST. VINCENT.

In the last number of the *Agricultural News* (p. 359) reference was made to the value of volcanic ash in the conservation of moisture in soils in the Eastern Canaries. Mr. W. N. Sands, Agricultural Superintendent in St. Vincent, has forwarded the following notes on the influence of volcanic ash on crops in that island:—

As far as St. Vincent was concerned, the advantage of the volcanic ash which fell during the last eruption was practically nil, as, with the exception of sugar-cane and leguminous crops, such as pigeon peas and ground nuts, no other crop can be grown satisfactorily in it. Of course the rainfall of the island is a heavy one, but even during two or three weeks of dry weather plants suffer severely.

Take for instance cacao. On the leeward side of the island, in those districts where a large amount of ash fell, the trees are producing little or nothing. They are much diseased, and present an unhealthy appearance generally. On the windward side of the island, at Mount Bentinck estate, the cacao trees are doing well, and this is due to the ash being entirely taken from around the trees after the eruption. On the leeward side the cacao trees were not treated in this way, and on inspecting the fields of Messrs. MacDonald Bros., at Richmond Vale, it was seen that the ash from the first eruption had set almost like concrete over the surface of the original soil, killing, of course, a large proportion of the roots near the surface; hence the bad condition of the trees.

Cotton, again, is more or less a failure in volcanic ash. Mr. Thornton and myself recently inspected large areas in the Carib Country, and, as mentioned previously, only deep cultivation and a system of mixing with the ash a large quantity of organic matter, by means of manure and green dressings, will bring back the lands to such a condition as will enable crops like arrowroot and cotton to be successfully grown.

The growth of the pigeon pea planted thickly, and buried in the ash just before it reaches the flowering stage, would help considerably. This plant grows extremely well, sends out a large number of roots into the ash, which, when examined, are found to bear a large number of nodules.

The planting of sugar-cane, which requires deep cultivation in order to produce a satisfactory crop, would also help, but a system of green dressings of leguminous plants appears to hold out most hope of success in the reclamation of these lands with a large proportion of ash and sand.

THE ECONOMIC USES OF THE PALMS.

The following is the concluding portion of the summary of Mr. Buttenshaw's paper on the economic uses of the palms:—

SAGO PALMS.

Sago is a starchy substance obtained from the pith of several palms. Sago of commerce is obtained from the pith of *Metroxylon Sagu*, a tree growing to a height of 40 to 50 feet, with a trunk from 1 foot to 2 feet in diameter. The palm lives to an age of about fifteen to twenty years, when it flowers. The flowers take about three years to ripen. To obtain sago, the palms are cut down when the inflorescence appears. The trunk is cut into logs 6 or 7 feet long, and these are split into two. The stem consists of a thin, hard wall, about 2 inches thick, and of an enormous volume of a spongy medullary substance. The pithy matter is taken out and powdered; the powder is mixed with water and the starch obtained in the usual way by suspension. It is stated that a single tree will yield 500 lb. to 800 lb. of sago. The imports of sago into Great Britain practically all come from the Straits Settlements.

Arenga saccharifera is the Malayan sago palm, very commonly cultivated in India. The heart of the stem contains large quantities of farinaceous matter.

WINE PALMS.

Palm wine or toddy is obtained by cutting the spadices (or flower-stalks) of several palms, the principal being the wine palm (*Caryota urens*), which is not uncommon in West Indian gardens. It is a native of the East Indies. It yields from the spathe (i.e., the leaf which envelops the inflorescence) a quantity of toddy or palm wine. From its trunk, a kind of sago is obtained which is made by the natives into bread or a kind of gruel.

The cut flower-stalks of *Arenga saccharifera* and *Nipa fruticans* also yield a sugary sap which is made into wine.

FIBRE-PRODUCING PALMS.

Palm fibres rarely attain sufficient development to be of much commercial utility. Many of them, however, have important uses among the natives of tropical countries, being used for making cordage, hammocks, etc. It will be possible to mention here only a few of the most important.

Some of these fibres are obtained from the leaflets, others from the petioles (or foot-stalks) of the leaf, while in other cases the spathe (the large bract which sheaths the unfolded inflorescence) and the fruit (as in the cocoa-nut) afford the fibre.

Of palm leaf fibres, the best known is raffia, obtained by peeling off the cuticle of the leaflets of *Raphia Ruffia*, a Madagascar palm. This is the fibre which is in such common use among gardeners. From the oil palm leaf a fibre is obtained which has been described as being 'as fine and tenacious as human hair.' Vegetable hair of commerce is furnished by the dwarf palm of northern Africa (*Chamaerops humilis*).

The best known of the petiole fibres are the various forms of piassava or bass. The following are recognized in the trade: Bahia (*Attalea funifera*), Para (*Leopoldina Piassaba*), Kittool (from the wine palm, *Caryota urens*), Palmyra (*Borassus flabelliformis*), West African (*Raphia vinifera*), and Madagascar (*Dictyosperma fibrosum*). These fibres are utilized in the manufacture of brooms and brushes;

thus, the stiffest of all brushes, viz., the large, horse-drawn street-sweeping machines, are made from Bahia piassava.

Spathe fibres, as for example, that obtained from the Bussu palm in British Guiana (*Manicaria saccifera*) are made into caps, bags, mats, etc.

The best example of a fruit fibre is coir, obtained from the fibrous husk of the cocoa-nut palm.

TIMBER-PRODUCING PALMS.

On account of the soft nature of the interior of their stems, few of the palms produce timber of any value. Some of the hollow stems are used as drains or water channels, being fairly durable.

Malacca and Rattan canes are furnished by species of *Calamus*, the latter being much used in furniture making. From the stems of *Licuala* the well-known 'Penang Lawyers' are obtained. Many other palms provide walking sticks, notably the gru-gru.

MISCELLANEOUS PALM PRODUCTS.

Vegetable ivory, the chief substitute for elephant ivory, is obtained from the hard seeds of *Phytelephas macrocarpa*, which inhabits the banks of rivers in Central America. As the fruit grows old, the sweet milky juice solidifies into a substance as hard and white as ivory. This is chiefly used for making billiard balls. The seeds of another palm (*Metroxylon amicarum*) are also called ivory nuts. Coquilla nuts (from *Attalea funifera*), too, are largely used in turnery work.

A resin, known as 'Dragon's blood,' is obtained from *Daemonorops Draco* and several species of *Dracaena*. The fan-like leaves of *Copernicia cerifera* are covered with a thin coating of a waxy material. This is known as vegetable wax. Brazil exported, in 1903, £125,000 worth of this product. Another palm, *Ceroxylon andicola*, has a similar waxy deposit on its stems.

SEED PACKING FOR THE TROPICS.

The results of experiments with seeds sent from Kew to St. Vincent, in ordinary paper packets, were reported to the *Gardeners' Chronicle* by Mr. W. N. Sands, the Agricultural Superintendent. The trials of germination were carried out by Mr. W. H. Patterson, Resident Master of the Agricultural School.

Three tests were made, viz., on arrival (in May), after one month, and after two months, and in the case of beans and peas, a fourth test after three months. The average germination of thirty-four kinds was:—

- | | | |
|-----------------------|-----|-----------------------|
| (1) On arrival, | 82 | per cent. germinated. |
| (2) After one month, | 81½ | " " " |
| (3) After two months, | 70 | " " " |

The average for the beans and peas was:—

- | | | |
|-------------------------|-----|-----------------------|
| (1) On arrival, | 90 | per cent. germinated. |
| (2) After one month, | 90 | " " " |
| (3) After two months, | 84 | " " " |
| (4) After three months, | 80½ | " " " |

The average for some small seeds (giant onion, leek, parsnip, and tomato) after two months was less, only 12·5 per cent.

These results show, as Mr. Sands says, that seeds can be safely sent to the tropics in paper packets, but should not be kept over three months before sowing. It would be interesting to know if this would apply to very small seeds.



EDUCATIONAL.

Agricultural Teaching in Grenada.

The following is extracted from the Report on the Primary Schools of Grenada for the year 1905 :—

The requirements of the Code syllabus, so far as earning the grant of 3s. for every pass on the theoretical side of the subject, were, as usual, earnestly carried out by the teachers in standards VI and VII. In many schools the teaching is begun in standards IV and V, with satisfactory results. Many teachers have fallen in with suggestions made from time to time, to include plant life in the object-lesson course whenever practicable, as a stepping-stone to the teaching of agriculture. Five schools were noted in my last report as having kept their gardens in full working order for the whole year. For 1905 the number was nine, the additional schools being St. Andrew's Anglican, St. John's Anglican, St. George's Wesleyan, and Woburn Wesleyan. The lack of water in some districts causes the plots during the dry season to have a most abandoned appearance, but in some schools, notably the St. Paul's Anglican, under the management of the Rev. Mr. Branch, the pupils are required to keep always full the water casks and other receptacles provided, and to water judiciously as a means of withstanding the effects of a prolonged drought, of which there was an unusually severe spell towards the end of the year. The plots at the two schools in the St. Paul's district are those which present the best appearance, but for methodical, interesting, and experimental work, the St. John's Roman Catholic school, under the management of the Rev. Father Tigar, leaves little to be complained of, especially when the size of the plot and the difficulties of making and maintaining it are considered. It might be well to make it clear here, that only the continuous and persistent efforts of the manager and teacher of this school could have succeeded in converting what was merely an uninviting corner of their school yard into a presentable little corner now covered with beds, boxes, experimental nurseries, etc., etc.

The motion standing in the name of the Hon. Mr. de Freitas for the curtailment of the grants to those schools, which, having school gardens, do not proceed at once to make use of them, was not proceeded with by him owing to the decision of the Board to issue a new Code which would embody his views. No new plots were enclosed during the year. As against £13 granted for work on the practical side done in 1904, the Board for work in 1905 granted £18 as bonuses to the teachers of those schools that worked their gardens. His Excellency the Governor intimated to the Board, when approving of the grant of £18, that in the proposed new Code embodying his scheme, he would insist on about half of the curriculum in the schools of higher instruction providing for the teaching of agriculture, sanitation and hygiene, and technical pursuits.

Agricultural Teaching in British Guiana.

At the Government Industrial School in British Guiana twenty boys are usually employed in agricultural work, that is, pruning, setting, transplanting, pulping, and curing coffee and cacao, and generally tending young plants. The following reference to this work is made in the report on the school for 1905-6 :—

The boys mentioned as 'pruning,' etc., are employed in two parties under skilled workmen. One, Arthur Kortright, was trained at the Botanic Gardens, where he was employed for a very long time; he is a well qualified and useful officer. The other has had experience for about fourteen years as a driver on cacao estates in Trinidad. Boys in these parties are taught practically everything connected with the cultivation of cacao and coffee, from the setting of the beans to the time the product goes from the curing house into the store. They have also care of the experimental cotton field and economic plants sent here from time to time by the Director of Science and Agriculture.

The weeders, forkers, shovelmen, and wood-cutters are mainly composed of the biggest boys. The task system for this class of work has been introduced with the very best results. There is some inducement, other than the fear of punishment, for a boy to work well, as he not only pleases those in authority over him, but he also knows that, on satisfactorily completing his task, he is allowed to knock off and come in. It moreover enables us easily to distinguish between the good workers and the bad, the industrious and the lazy.

Farm boys, grass-cutters, and orderlies are selected from the smaller lads, and the fatigue party, which is employed in sweeping the yard and keeping the grounds in order, is generally composed of convalescents.

AGRICULTURAL SHOW AT MONTSERRAT.

The following report on the Local Agricultural Show held, under the auspices of the Imperial Department of Agriculture, at Harris Village, Montserrat, on November 9, has been forwarded by Mr. W. Robson, the Curator :—

This show brought forth a representative collection of food and other products. The number of entries was 400; this was very satisfactory, as exhibitors were confined to St. George's parish. Meals, starches, and native vegetables were especially prominent, as well as cacao and coffee.

Five Diplomas of Merit of the Imperial Department of Agriculture were awarded, as follows: Best bunch of bananas, collection of vegetables from school gardens, specimen of native furniture, tanned leather, and fancy work.

Special prizes were offered by his Honour the Commissioner and Mrs. Davidson Houston for the best-cared donkeys; also for fancy work. For the latter there was keen competition.

A few exhibits of interest were sent from the Botanic Station, including broom corn, powder bellows for distributing Paris green, desirable and undesirable cotton seeds for planting, citrons, lemons, Paris green, London purple, sisal hemp, etc.

Superior Kind of Papaw. A new kind of papaw has been introduced in St. Kitt's. It is called the Guinea papaw. The fruit is much superior to the common papaw or to the long cucumber-like fruit, known as the Barbados papaw. The pistillate flowers are white. The fruit is shorter than the common papaw, precisely melon-shaped, with the five ridges more distinctly marked, and of a deeper green when unripe. The ripe fruit is often very large and has a thicker, juicier, sweeter pulp than the other papaws, with a superior flavour. Remembering the potent digestive qualities of papain, this new papaw is worthy of a place in every West Indian orchard.

MARKET REPORTS.

London,—November 6, 1906. Messrs. KEARTON, PIPER & Co.; Messrs. E. A. DE PASS & Co. November 2; 'THE WEST INDIA COMMITTEE CIRCULAR,' November 6; 'THE LIVERPOOL COTTON ASSOCIATION WEEKLY CIRCULAR,' November 2; and 'THE PUBLIC LEDGER,' November 3, 1906.

ALOES—Barbados, 15/- to 60/-; Curaçoa, 18/- to 55/- per cwt.
ARROWROOT—St. Vincent, 2½d. per lb.
BALATA—Sheet, 1/5 to 2/-; block, 1/1 to 1/7 per lb.
BEES'-WAX—£7 15s. per cwt.
CACAO—Trinidad, 70/- to 76/- per cwt.; Grenada, 63/- to 69/- per cwt.

CARDAMOMS—Mysore, 11d. to 3/- per lb.

COFFEE—Jamaica, good ordinary, 42/- per cwt.

COTTON—Medium fine, 6.40d.; West Indian Sea Island, medium fine, 13½d.; fine, 14½d.; extra fine, 16d. per lb. Prices paid 7¼d. to 13½d. per lb.

FRUIT—

GRAPE FRUIT—4/6 to 8/- per box.

BANANAS—Jamaica, 4/6 to 5/6 per bunch.

LIMES—3/- to 3/6 per box of 200.

ORANGES—5/6 to 7/- per box.

PINE-APPLES—St. Michael's, 1/6 to 4/- each.

FUSTIC—£4 to £4 10s. per ton.

GINGER—Jamaica, 54/- to 75/- per cwt.

HONEY—Darkish liquid, 19s; pale, part set, 21s. to 22s. 6d. per cwt.

ISINGLASS—West Indian lump, 1/8 to 2/2; cake, 1/- to 1/1 per lb.

KOLA NUTS—2½d. to 6d. per lb.

LIME JUICE—Raw, 10d. to 1/2 per gallon; concentrated, £22 per cask of 108 gallons; hand pressed, 2/1 to 2/3 per lb. Distilled Oil, 2/6 per lb.

LOGWOOD—£4 to £4 15s.; roots, £3 10s. to £4 per ton.

MACE—Fair reddish 1/3; broken, 1/1 per lb.

NITRATE OF SODA—Agricultural, £12 12s. 6d. per ton.

NUTMEGS—68's, 1/6; 81's, 11d.; 86's, 9½d.; 94's, 8d.; 120's, 6d.; 129's, 5½d.; in shell, 4d. per lb.

PIMENTO—Fair, 2½d. per lb.

RUM—Jamaica, 2/2 per proof gallon.

SUGAR—Yellow crystals, 16/- per cwt.; Muscovado, grocery, 14/- to 15/- per cwt.; Molasses, 11/- per cwt.

SULPHATE OF AMMONIA—£12 7s. 6d. per ton.

Montreal,—September 14, 1906.—Mr. J. RUSSELL MURRAY.
(In bond quotations, c. & f.)

COCOA-NUTS—Jamaica, \$26.50 to \$28.50; Trinidad, \$25.00 to \$26.00 per M.

COFFEE—Jamaica, medium, 10c. to 11c. per lb.

GINGER—Jamaica, unbleached, 16c. per lb.

MOLASCUIT—Demerara, \$1.00 per 100 lb.

MOLASSES—Barbados, 26c. to 27c.; Antigua, 21c. per Imperial gallon.

NUTMEGS—Grenada, 110's, 18c. per lb.

PIMENTO—Jamaica, 6½c. per lb.

SUGAR—Grey crystals, 96°, \$2.50 per 100 lb.

—Muscovados, 89°, \$2.00 per 100 lb.

—Molasses, 89°, \$1.75 per 100 lb.

New York,—November 16, 1906.—Messrs. GILLESPIE BROS. & Co.

CACAO—Caracas, 17c. to 18c.; Grenada, 15½c. to 16c.; Trinidad, 16¼c. to 17½c.; Jamaica, 13½c. to 14½c. per lb.

COCOA-NUTS—Jamaica, \$34.00 to \$35.00; Trinidad, \$33.00 to \$37.00 per M.

COFFEE—Jamaica ordinary, 8¼c.; good ordinary, 8½c. to 8¾c. per lb.

GINGER—Dark scraggy root, 9½c. to 10¾c.; small to bright bold, 11c. to 14c. per lb.

GOAT SKINS—Jamaica, Antigua, and Barbados, 59c.; St. Kitt's, St. Thomas, and St. Croix, dry flint, 47c. to 51c. per lb.

GRAPE FRUIT—Jamaica, \$2.00 to \$4.00 per barrel; \$1.25 to \$2.50 per box.

Honey—Jamaica, 71½c. per gallon.

LIMES—\$4.00 per barrel.

MACE—32c. to 35c. per lb.

NUTMEGS—85's to 90's, 17c.; 95's to 100's, 14½c.; 105's to 110's, 13½c.; 115's to 120's, 12c.; 120's to 140's, 11c.

ORANGES—Jamaica, \$2.00 to \$2.25 per box; \$3.75 to \$4.50 per barrel.

PIMENTO—5c. per lb.

SUGAR—Centrifugals, 96°, 31½c.; Muscovados, 89°, 31½c.; Molasses, 89°, 31½c. per lb., duty paid.

INTER-COLONIAL MARKETS.

Barbados,—November 19, 1906.—Messrs. T. S. GARRAWAY & Co., and Messrs. JAMES A. LYNCH & Co.

ARROWROOT—St. Vincent, \$4.50 to \$5.00 per 100 lb.

CACAO—\$14.00 to \$15.00 per 100 lb.

COCOA-NUTS—\$11.00 per M. for husked nuts.

COFFEE—\$10.50 to \$12.00 per 100 lb.

HAY—8c. to \$1.20 per 100 lb.

MANURES—Nitrate of soda, \$65.00; Ohlendorff's dissolved guano, \$55.00; Cotton manure, \$42.00; Cacao manure, \$42.00 to \$45.00; Sulphate of ammonia, \$75.00; Sulphate of potash, \$67.00 per ton.

ONIONS—Madeira, \$2.60 to \$4.00 per 100 lb.

POTATOS, ENGLISH—\$1.80; Nova Scotia, \$1.44 to \$1.84 per 160 lb.

RICE—Ballam, \$5.70 to \$6.25 per bag (190 lb.); Patna, \$3.00 to \$3.75; Rangoon, \$2.70 to \$2.75 per 100 lb.

SUGAR—No quotations.

British Guiana,—November 24, 1906.—Messrs. WIETING & RICHTER.

ARROWROOT—St. Vincent, no quotations.

BALATA—Venezuela block, 25c.; Demerara sheet, 38c. per lb.

CACAO—Native, 12c. to 13c. per lb.

CASSAVA—60c. per barrel.

CASSAVA STARCH—\$5.25 per barrel.

COCOA-NUTS—\$10.00 to \$12.00 per M.

COFFEE—14c. per lb.

DHAL—\$4.50 to \$4.60 per bag of 168 lb.

EDDOS—72c. to \$1.20 per barrel.

MOLASSES—16½c. per gallon.

ONIONS—Madeira, 4c. to 4½c. per lb.

PLANTAINS—20c. to 36c. per bunch.

POTATOS, ENGLISH—Nova Scotia, \$2.50 to \$2.75 per barrel.

POTATOS, SWEET—Barbados, 96c. to \$1.08 per bag.

RICE—Ballam, \$6.10 per 177 lb.; Creole, \$4.75 to \$5.00 per bag (ex store).

SPLIT PEAS—\$5.90 per bag (210 lb.).

TANNIAS—\$1.92 per barrel.

YAMS—White, \$1.68 to \$2.16; Buck, \$2.40 to \$3.00 per bag.

SUGAR—Dark crystals, \$2.50 to \$2.60; Yellow, \$2.50 to \$2.60; White, \$3.50 to \$3.60; Molasses, \$1.50 to \$1.60 per 100 lb. (retail).

TIMBER—Greenheart, 32c. to 55c. per cubic foot.

WALLABA SHINGLES—\$3.00, \$3.75, and \$5.25 per M.

Trinidad,—November 23, 1906.—Messrs. GORDON, GRANT & Co.

CACAO—Ordinary to good red, \$16.75 to \$17.00; estates, \$18.00 per fanega (110 lb.); Venezuelan, \$17.25 to \$18.00.

COCOA-NUTS—\$21.00 per M., f.o.b.

COCOA-NUT OIL—75c. per Imperial gallon (cask included).

COPRA—\$3.95 to \$4.05 per 100 lb.

DHAL—\$4.40 to \$4.50 per 2-bushel bag.

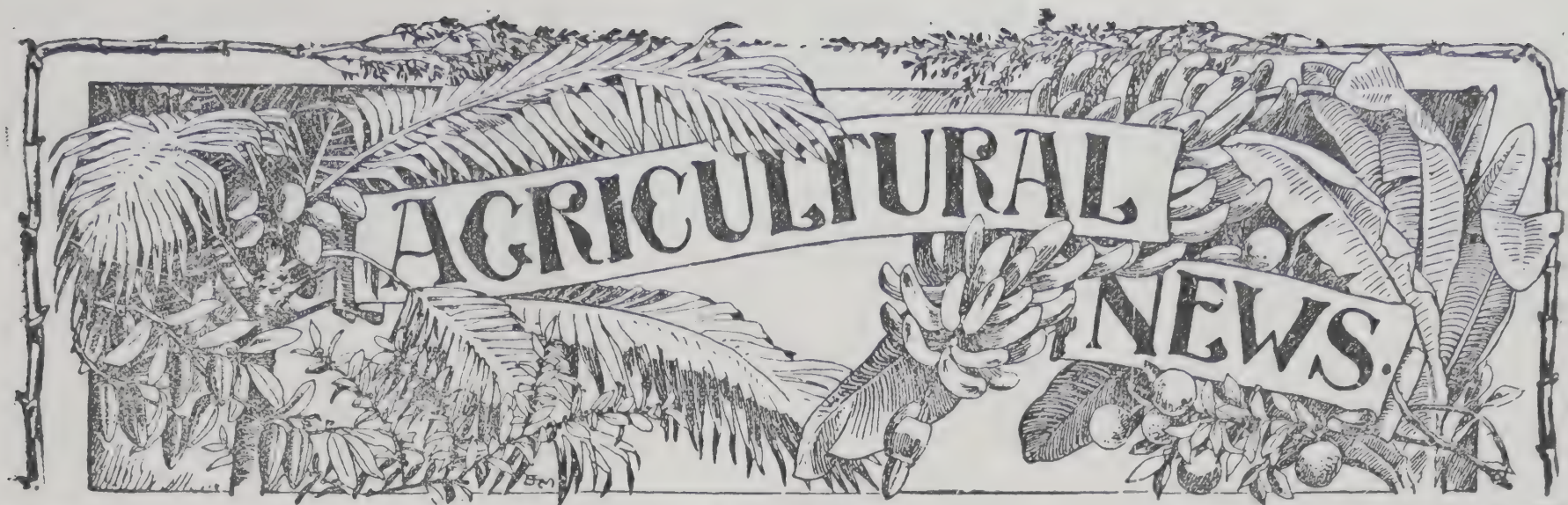
ONIONS—\$2.00 to \$2.25 per 100 lb. (retail).

POTATOS, ENGLISH—80c. to \$1.20 per 100 lb.

RICE—Yellow, \$5.25 to \$5.50; White, \$5.40 to \$6.00 per bag.

SPLIT PEAS—\$5.60 to \$5.70 per bag.

SUGAR—Grocery, \$4.80 to \$5.00 per 100 lb.



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Poultry Raising.

IN all parts of the world poultry are raised by agriculturists, and poultry raising is considered an important adjunct to farming. In many countries, where large numbers of the rural population live a somewhat isolated existence, it is often impossible to obtain a daily supply of fresh meat

for the table. In tropical countries, where meat can be kept only a very short time, this is particularly the case, and, consequently, the poultry yard has to be relied upon to supply a large proportion of the animal food required by all classes of the community.

The Imperial Department of Agriculture has never lost sight of this fact, and for many years considerable effort has been made to assist in improving the local breeds of poultry. To this end, in many of the West India Islands, birds of improved breeds have been imported, and eggs from them distributed. Further, in 1903, the Department issued a pamphlet (No. 23), entitled 'Notes on Poultry in the West Indies,' (to be obtained of all agents for the sale of the publications of this Department, price 4d., post free, 5d.), which has proved to be of considerable assistance to poultry raisers in these islands. This pamphlet was written by Mr. John Barclay, the Secretary of the Jamaica Agricultural Society, who has been for some years engaged in the development of a poultry industry in Jamaica, and has had personal experience in the keeping of most of the breeds mentioned. It placed at their disposal information in regard to the selection and rearing of poultry, and the treatment of diseases, exactly suited to the conditions existing in the West Indies. One of its chief merits, as a guide to poultry keeping in the West Indies, is that poultry raisers were shown how they could make the most intelligent and economical use of native food stuffs in preference to those imported from other countries.

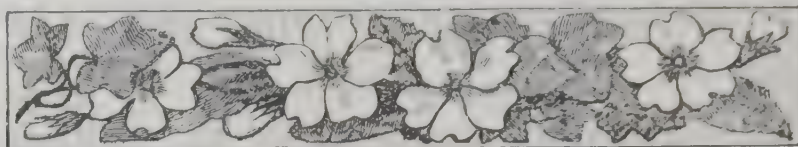
It is not suggested that there is any possibility of the West Indies developing an export trade, other than, perhaps, between certain of the islands themselves, in eggs or fowls, but there can be no doubt that the

raising of these cheap and nutritious foods for home consumption is sound economy. Poultry can be raised with a very small expenditure and will obviate the outlay of money for comparatively expensive imported food stuffs, which are, for the most part, of less nutritive value.

In many countries poultry raising is an industry of very considerable value. In Canada, for instance, the shipping of poultry and eggs is being encouraged with the result that the industry is steadily increasing. Again, it may be mentioned that Great Britain imported eggs alone, during the year 1905, of the value of £6,812,436. According to the figures placed before the Royal West India Commission in 1896 (p. 81 of the Report), the total value of all the exports from the West Indies and British Guiana, including sugar, cacao, fruit, etc., amounted to £6,102,000. These figures show in a very striking manner what an enormous value a comparatively small industry may attain where the necessary conditions exist for its full development.

In further reference to the subject of the great possibilities attending poultry raising, it may be of interest to quote as follows from the preface to a new work on poultry—*Races of Domestic Poultry*, by Edward Brown, F. L. S., (London, Edward Arnold, 41 and 43, Maddox Street, W.), which is briefly reviewed elsewhere in these columns:—

‘Within the last decade there has been a great awakening to the importance of poultry as a branch of farm stock, and in respect to the food supply of our great and growing populations. Hence they have received more attention than at any period of human history, and one of the first steps is seen in the improvement of existing breeds and the introduction of newer and more profitable stock. When this stage is reached, productiveness in respect to eggs and flesh becomes of supreme importance, and a race is judged by what it will yield in either or both of these directions, not what its colour of plumage or fancy points may be. Many of the breeds of poultry lack much in respect to fixity of type, and the great majority, more especially those found in Mid, Eastern, and Southern Europe, cannot compare favourably in productiveness with the best races met in Western Europe and America. But they are capable of great improvement in these directions, and some, at least, will doubtless, ere long, when the principles of selection and breeding are applied to them, be equal to, and perhaps take the place occupied by, our more prominent breeds, when the latter have lost some, at least, of their present virility as a result of our intensive methods.’



SUGAR INDUSTRY.

Seedling Cane B. 376 in Barbados.

An adjourned meeting of the Barbados Agricultural Society was held on December 7 for the purpose of discussing the results of the sugar-cane experiments carried on in Barbados during the last crop season, reference to which was made in the *Agricultural News*, Vol. V, pp. 369-70.

In the course of the discussion the Hon. G. Laurie Pile gave some interesting figures in regard to the cultivation of B. 376 on a large scale on one of his plantations:—

Last year he put 58 acres out of 90 in this cane, the remaining 32 acres representing several varieties. The cane was grown under ordinary conditions in the various sorts of soil running through the estate, and was treated in the same way as all the canes were treated last year. These 58 acres gave an average yield of 29½ tons of canes per acre—some a little more, some a little less. The largest return from one field was 36 tons per acre.

With regard to the juice, it was particularly good, and gave an average of 2.95 tons of sugar per acre. He might mention that this return was in a measure due to superior extraction, because it happened at Brighton, where there was a five-roller mill. It also pointed to the fact that what was wanted in Barbados was better extraction to get more out of the canes. No one could grow better canes than the planters of Barbados, but they lost, by imperfect extraction, at least 25 per cent. to 30 per cent. of the juice.

The mixed canes in the remaining 32 acres gave about ¾ ton less than B. 376. He might mention that he had 20 acres of second crop B. 376, and this cane gave him a much larger yield per acre than any other cane he reaped as second crop; it gave him an average of about 2 tons of sugar to the acre. Therefore, he thought B. 376 was a better cane than it was believed to be merely by its cultivation in small experimental plots. It was a cane which germinated well, it stood the weather well, and grew not only a good first crop, but also a good second crop.

Central Sugar Mills in Queensland.

Certain of the Queensland central sugar factories are operated under the control of the Government, the actual supervision being deputed to Dr. Walter Maxwell as Comptroller. In his second annual report (dated September 21, 1906) upon the conditions and operations of these Government central sugar mills, Dr. Maxwell discusses the agricultural work at the mills as follows:—

The strongest evidence of real development that is taking place in the agricultural work connected with the mills is the increase in numbers of farmers who are now engaged in cane production. At the five mills in the possession of the Treasurer, there were, in 1903, 315 cane growers, and in 1906 that number is increased to 542. A still greater increase is found in the tonnage of cane produced and delivered to the mills; but that result is due in part to the more beneficent seasons as well as to the increase in number of the producers.

A strong spirit of encouragement and hope has been produced amongst the growers by the policy which has placed all the producers upon a uniform basis in respect of the price paid for cane, and other terms and privileges. The rendering of financial assistance, at a low rate of interest, and to all growers alike, providing satisfactory security was in sight, has proved a timely and practical aid. Although the older and settled growers have been rendered very largely independent, and able to finance themselves, by the recent more favourable years, the mills are still furnishing aid to new settlers where it is required and warranted. The mills are also distributing new varieties of cane amongst the suppliers.

In regard to manufacture, the following extract is of interest:—

Concerning these mills, each one considered in its entirety, not one of them is a modern mill, compared with the mode of construction and with the co-efficients of power and results of the modern mills of the day. These mills have neither the crushing, boiling, or crystallizing co-efficients of the most recent types of mill construction. With a use of 30 per cent. to 40 per cent. of maceration it is difficult to reach a higher average extraction than 90 per cent. by the roller power now in use at the mills under discussion, while the great modern mills of Java, Cuba, and Hawaii reach an average extraction of 95 per cent. to 97 per cent., with a maceration equivalent that allows of the whole steaming power to be obtained from the bagasse as fuel, and without the use of either coal or wood. It must be understood, however, that while the want of balance between the stations in these mills is due to the construction at the time, the relatively low standard of efficiency of the mills as types, and of each one as a whole, was not a fault at the time they were constructed. When they were built and equipped they were modern plants; but that is a dozen years ago, and their day has gone by, being surpassed by mills of a greatly increased power and efficiency. At this time, there is not a modern mill in Queensland, when the comparison is drawn between the best that exist in this country and the more recent types and equipments in some other countries.

The Comptroller is endeavouring to establish a uniform system of management, and, as far as the conditions will allow, a uniform method of conducting and recording the practical operations of the several mills. To this end, in the first place; control chemists are engaged at each mill, each chemist acting under uniform instructions in respect of methods of analysis, and forms of calculating and presenting results. In addition to the chemists located at the respective mills, the supervising chemist is engaged under special instructions, in periodically visiting the several mills in order to oversee the work of the local chemists, and also to report to the Comptroller regularly upon the actual results of the mill operations as indicated by the technical control.

Hawaii.

The following note on the general condition of the sugar industry in Hawaii is extracted from the *U. S. Monthly Consular Reports* for November:—

Sugar being the money crop of the islands, the cane is cultivated on a large scale and is a very important industry, covering about 200,000 acres. In the use of improved methods in this industry and in yield of cane per acre and yield of sugar per ton, Hawaii probably leads the world. Steam ploughs are used in the fields, private steam railways on the plantations carry the cane from the field to the mill, where the latest steam and electrical machinery is used,

and then it is shipped on the plantation railway to the plantation wharf to be carried to Honolulu or Hilo for shipment east. Vast irrigation works and costly pumping stations have been installed. Some of the mills cost over a million dollars each, and the companies, of which there are over sixty in the islands, are capitalized at from a few sand to five millions.

The quantity and value of the sugar exported for the last ten years are as follows:—

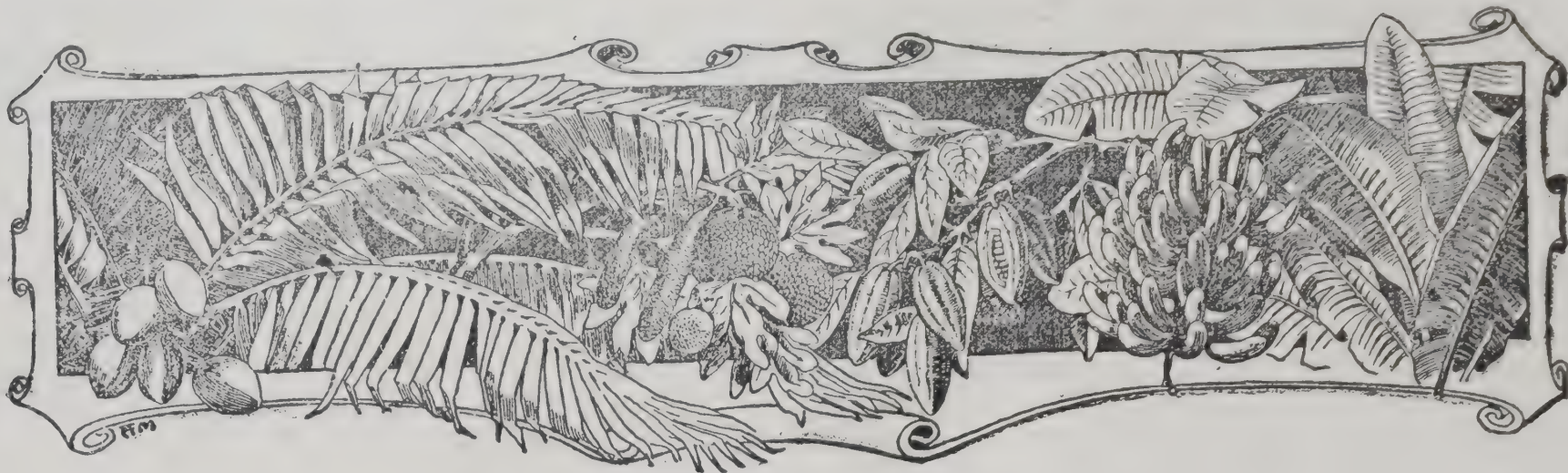
Year.	Pounds.	Value.	Price per lb. in cents.
		\$	
1897	431,196,980	13,164,379	3.05
1898	499,766,798	16,660,109	3.33
1899	462,299,880	17,287,683	3.72
1900	504,713,105	20,392,150	4.05
1901	690,877,934	27,093,863	3.92
1902	720,553,357	24,147,884	3.35
1903	774,825,420	25,665,733	3.31
1904	736,496,992	24,359,385	3.30
1905 {Raw ...	811,603,329	33,946,040	4.19
{Refined...	21,118,308	1,166,108	5.52
1906 {Raw ...	712,560,997	23,840,803	3.35
{Refined...	34,041,640	1,654,624	4.86

WATER FOR BEES.

Mr. R. Beuhne, the President of the Victorian Apiarists' Association, writing in the *Journal of Agriculture* of Victoria, says:—

Few bee keepers are aware of what amount of water is required by a colony of bees during the summer months, and how important it is that a permanent supply should be available within a reasonably short distance of an apiary. As a general rule, bees are left to themselves to get their supply of water wherever they can. There is usually a natural watercourse, dam, or waterhole, somewhere in the neighbourhood, and if permanent and within a few hundred yards of the apiary, such sources answer well enough. When, however, water is not permanently available within $\frac{1}{4}$ mile, it is greatly to the advantage of the apiarist to provide an artificial supply as near the apiary as is convenient. Where many bees are kept, and the water supply is limited, they become a nuisance to stock, and sometimes a source of ill feeling between neighbours in consequence. Bees are also very annoying about the apiarist's own home, round water-taps, tanks, and the drinking dishes of poultry, when the weather is hot, and any other supply of water is rather far from the apiary.

An iron water-pipe, laid underground (18 inches deep) so as to keep it cool in summer, conducts the water to the drinking troughs, which are at a distance of about 100 feet from the building, and the same distance from the nearest hives. This distance is necessary, otherwise the bees, when flying to and from the water, interfere with work in the apiary, and also cause confusion at swarming time. There are two drinking troughs; they are placed on a stand at a height of 3 feet from the ground, in order to prevent poultry going to them, and to keep drifting leaves and other material out as much as possible. It is better to have two or even three of such troughs instead of a large one of the same surface area as the two or three combined. If only one large trough is used the bees are too much concentrated, and a good deal of fighting and stinging takes place occasionally.



WEST INDIAN FRUIT.

LEMON TRADE.

The *Journal of the Jamaica Agricultural Society*, for November, has the following note on the lemon trade, and draws attention to the possibilities of an export trade in lemons from Jamaica. Reference has already been made in the *Agricultural News* (Vol. V, p. 244) to efforts that have been made in Dominica in this connexion:—

The highest price on record for Naples lemons [in the United Kingdom] was reached at the sales on September 10, when 82s. was paid for some cases, and an average of 50s. 5d. for 1,247 cases, containing 420 lemons each. If those who have lemon trees would only work them to get the fruit in from May to September, very good prices would be realized.

Two shipments of lemons—one in August, and one in October—have been sent by us to London to test the market on behalf of a member. The report on the first was that the fruit arrived in miserable condition, even though they had been sweated here in the most approved style, and were exactly the same class of lemons as were awarded a medal at the Colonial Fruit Exhibition early in the year. The price then ranged from 14s. to 45s. per case of 420. The second shipment was also a bit wasty, that is, a few rotten in each case, but they realized 12s. per case.

There is no doubt that there is a remunerative market for lemons, if they arrive in good condition in the United Kingdom, from June till the end of September. At present a trade is being done with Canada via Halifax.

PROPAGATION OF TOMATOS BY CUTTINGS.

It is well known in the West Indies, that the seed from a good American variety of tomato, locally grown, does not produce such large fruits, as seed direct from England or the United States. The tomato, however, is very easily grown from cuttings, and advantage can be taken of this fact to prevent deterioration of the fruit. This method has been practised, for several years, at St. Lucia. A planter in Christ Church, Barbados, has also grown tomatos from cuttings, without using any seed, for ten years. The cuttings, when rooted, are planted out in the cane field. The field being a dry one, the plants are not staked, but are allowed to bend to the ground under the weight of the fruit. In favourable seasons excellent crops of this wholesome vegetable have been produced by this method.

CONDENSED VEGETABLE MILK.

The following note appeared in *Nature*, October 25:—

Mr. T. Katayama, a writer in a recent issue of the *Bulletin of the Agricultural College, Tokyo* (Vol. VII, no. 1, April 1906), describes the preparation of condensed vegetable milk, a product which, though not yet in commerce, would appear to have possibilities for tropical countries. The Japanese prepare vegetable milk from soy beans by soaking, crushing, and boiling in water. The liquid obtained is said to be very similar in appearance to cows' milk, but it differs widely in composition. The average composition of soy milk is given as: water, 92.5 per cent.; protein, 3.02 per cent.; fat, 2.13 per cent.; fibre, 0.03 per cent.; nitrogen-free extract, 1.88 per cent.; ash, 0.41 per cent. To this material, Mr. Katayama added sugar and a little dipotassium phosphate, the latter to prevent protein separating out; he then evaporated the mixture, and obtained a condensed milk. This product is described as having a yellowish colour, an agreeable taste like cows' milk, but a slight odour of beans. It is recommended for culinary purposes as a cheap substitute for ordinary condensed milk.

MUSEUM OF THE AGRICULTURAL INSTITUTE, GUADELOUPE.

During a recent tour through the Northern Islands, the Entomologist on the staff of the Imperial Department of Agriculture had an opportunity of spending a day at Pointe-à-Pitre, Guadeloupe, where he paid a visit to the Museum of the Agricultural Institute.

This museum appeared to contain a very good collection of the various forms of the local fauna and flora, together with many geological specimens and relics of the Carib Indians.

The zoological specimens represented every class of the animal kingdom, and was said to be fairly complete for the land forms. Fresh-water forms and a considerable number of marine forms were also to be seen, while a large collection of Carib implements and relics was on show.

It was learned that these specimens were, for the most part, prepared and arranged by Dr. L. Vitrac, by whom, also, many of them were collected.

Very few insects were in the museum, as Dr. Vitrac keeps that collection at his residence. He is a keen entomologist, and his collection is a large one, giving evidence of much time and care spent in its preparation.

SISAL HEMP AT MONTSERRAT.

The accompanying illustration (fig. 27) shows the plot of sisal hemp at the Montserrat Botanic Station. The history of this experiment plot, as given in the last Annual Report, is as follows:—

Area of plot, $\frac{1}{6}$ area. Planted from bulbils in September 1902, 6 feet apart each way.

Catch crops of onions, etc., were grown between the rows for two years, so that the cost of cultivation of sisal alone is not shown.

First reaping, December 1904. Yield of green leaves, 5,053 lb.

Second reaping, September 1905. Yield of green leaves, 5,950 lb.



FIG. 27. SISAL HEMP AT MONTSERRAT BOTANIC STATION.

The fibre was extracted from 66 lb. of leaves by maceration, and weighed $2\frac{1}{2}$ lb. This works out at 225 lb., or approximately 2 cwt. from the plot, and at the rate of 12 cwt. per acre.

The yield compares favourably with that obtained in Yucatan and the Bahamas. It is reported that by this method of extracting the fibre a minimum proportion is obtained.

PACKING PALM SEEDS.

Palm seeds are frequently sent long distances between different places in the tropics and also to hot-houses in the temperate zones. Those that have a pulpy fruit do not travel well if sent with the pulp on, for rotting of the pulp in a close box has often affected the embryo as well. The best general method seems to be to remove all pulp and to pack the stones or seeds in powdered charcoal, which has been washed and allowed to become moderately but not quite dry.

MULCHING IN DRY WEATHER.

Watering is not the only method by which plants may be carried over a period of drought. A good and cheap way is to stir the surface soil with rake, hoe, or cultivator to a depth of 1 inch or 2 inches. This is called a dust mulch.

It prevents the sun from drying up the unstirred soil underneath. It must be repeated after rain, as soon as the surface is dry. One famous potato grower of the United States claimed that by constantly stirring the first inch or two of soil he could carry his potato fields from planting to crop without an additional drop of rain. Another method is to spread sand, stones, dry grass, dead leaves, dead weeds, cane trash, megasse, pen manure, or other vegetable substances on the surface of the field or bed.

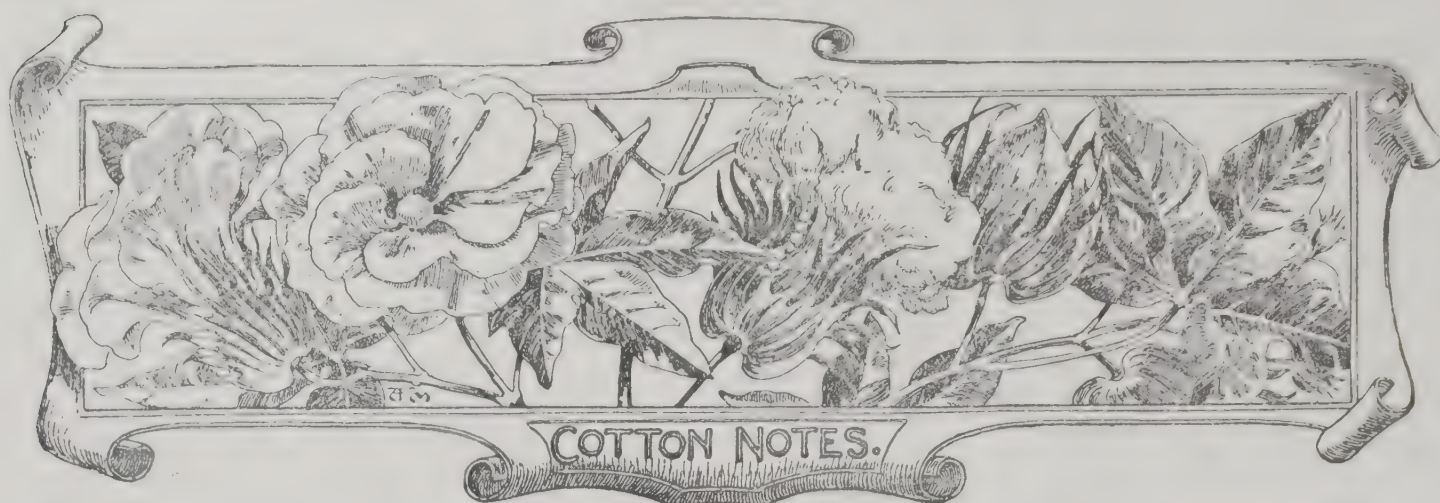
Reference may be made to the excellent results obtained at Dominica by mulching cacao with grass and leaves, as reported in the *West Indian Bulletin*, Vol. VII, p. 204. In a cane field, the trash, whether on the surface or slightly buried, forms an excellent mulch. If weeds and grass taken from a garden are piled up till dead and spread around plants and trees that need watering, the trouble of watering will be lessened, and, in many cases perhaps, the plant saved. In islands where water is scarce, a layer of stones, 4 inches deep, forms a very good mulch, especially in places exposed to high winds. Those who have never tried a mulch in their gardens will find it difficult to realize what a large amount of water is saved to the plant by this method.

King states in his book, *The Soil*, that he found in America that 6.24 tons of water a day were evaporated from 1 acre of unstirred soil, while when the surface was raked or harrowed to $\frac{4}{5}$ inch deep, only 4.52 tons were evaporated. A mulch of dry clay loam, $\frac{4}{5}$ inch deep, spread on the surface, saved nearly 4 tons of water per acre per day.

Mr. T. Burns, B.Sc., of the School of Agriculture, Ghizeh, Egypt, made a series of experiments, lasting over nearly a year, on the effects of raking the soil, 2 inches and 4 inches deep. These experiments are reported in the *Yearbook* of the Khedivial Agricultural Society, for 1905. The moisture was determined in the first foot of soil and the plots were irrigated at the beginning of every month.

‘During the hot months of May, June, July, and August the plot, which was kept broken to a depth of 2 inches, retained as much moisture, four weeks after watering, as the unraked plot did two to two and a half weeks after that operation. Three and four weeks after watering, the raked plots were found to contain 2 to $2\frac{1}{2}$ per cent. more moisture than the unraked plot, which corresponds with between 27 and 36 tons more water per acre in the layer considered.

‘Thus we see that regular raking increases the period which may be allowed to elapse before irrigation. Another point to be noted is that, whereas in winter it made little difference whether the land was raked to 2 or 4 inches deep—what advantage there was being with the deeper raking—in the hot summer months the shallower raking proved the better. The deeper raking during this period resulted in an increased loss of water which was not compensated for by extra moisture preserved in the rest of the 12-inch layer tested. Raking during summer is a very necessary operation; but it should be as light as possible.’



SEASONABLE NOTES.

Very heavy rains have been falling in Barbados for some time past, and at the time of writing the fields are in a sodden condition. This is very unfortunate as many fields are now ready for picking, and with the plants in their present condition light showers would have been much more useful.

It is important to note that those fields which were planted according to the recommendations of the Imperial Department of Agriculture have withstood the heavy rains much better than those in which the plants have been crowded. More than one large cotton planter is now emphatically convinced that the best results are obtained by planting in single straight rows from 5 to 6 feet apart.

As a result of the wet conditions, the seeds in many instances have germinated before the seed-cotton could be picked. It is very desirable that the attention of planters should be drawn to this. When the seed-cotton is brought in from the fields it should be very carefully assorted; all the seed-cotton in which the seeds have germinated should be separated from the rest, and on no account should it be mixed with the good seed-cotton.

There is a very important question being asked by planters, namely: If the worms should appear in a field of cotton after the bolls have commenced to open, is it advisable to dust with Paris green and lime? The answer is decidedly in the affirmative. During the development of the bolls a very large quantity of food material is being drawn to these parts, and if the leaves should be removed the food material is likely to run short, and as a consequence the bolls must suffer. The amount of Paris green and lime which will fall on the lint in the bolls is very small and is not likely to do any damage. In any case the damage caused by allowing the leaves to be eaten off will be much greater than could possibly be caused by the Paris green and lime falling on the lint in the open bolls.

CULTIVATORS IN COTTON FIELDS.

In most cotton fields in the West Indies, the land will have to be kept clean by means of the hoe.

Where the system of cane holing, and the forming of cross bars is adopted, it is impossible to use any machine; but where cotton is planted on the flat, or where only ridges and furrows are formed, it becomes an easy matter to keep the land free from weeds by the use of the cultivator.

In St. Croix cultivators are used with great success. The machines used are light, they can be drawn by one mule, and are capable of going over 3 acres per day. The cost of these machines is about \$10 each.

In places where there is a deficiency of labour the use of these machines may be worth considering.

INSURANCE OF COTTON SHIPMENTS.

The Secretary of the British Cotton-growing Association has written to the Imperial Commissioner of Agriculture as follows, under date November 27, in regard to the insurance of shipments of cotton from the West Indies:—

Now that the shipments of the new season's cotton crop have commenced, or will shortly do so, we think it would be advisable to draw the attention of the planters in the West India Islands to the arrangements made for insuring consignments, as expressed in our letter of May 29, in order that no misunderstanding or confusion may arise, and we shall therefore be glad if you will kindly refer to same in the next issue of the *Agricultural News*.

The letter referred to above contains the following, which was published in the *Agricultural News*, Vol. V, p. 198:—

We are prepared to insure any shipments of cotton from the West Indies, which are consigned to us, where same have not already been insured by the consigners, under our open policy with the Marine Insurance Company.

As, however, we cannot tell whether the insurance has been effected or not, unless it is stated in the consigner's letter of advice, or on the bill of lading, we shall be glad if you will kindly inform the planters in the West India Islands that, if they wish us to attend to the insurance of any cotton they may ship, they must specially request us to do so when they advise the shipment, and give us as many particulars as possible respecting same, such as the weight of the cotton, its approximate value, etc. Unless this is done, we cannot undertake any responsibility in the event of the cotton being lost or damaged.

SEA ISLAND COTTON IN THE UNITED STATES.

Reporting on November 17, Messrs. Henry W. Frost & Co., of Charleston and Savannah, state with regard to Islands cotton as follows:—

There was a good demand for all the limited offerings of the odd bags, classing fine at 29c., fully fine 30c., extra fine 32c., the buying being for England and France. But as the receipts continue small, and with unfavourable crop advices, the Factors conferred and agreed among themselves not to sell further except on a basis of fine 30c., fully fine 32c., extra fine 35c. At this advance the market is quiet, but there is some inquiry which may result in some demand over prices ruling the early part of the week.

Several planters' crop lots have been sold for France at prices ranging from 38c. to 50c.

A week later the same firm reported as follows:—

The demand continued for all the offerings of odd bags, resulting in sales at prices showing 1c. to 3c. advance over those current the previous week. The market closed very firm with Factors indifferent sellers of fine at 30c., fully fine 32c., extra fine 35c.

There being no accumulation of stock, the offerings are limited to the daily receipts. Besides about seven planters' crop lots were sold at prices ranging from 35c. to 55c. This demand makes Factors very firm and inclined to make no concessions, but rather to advance prices.

The buying was largely for the northern mills and France.

BARBADOS COTTON INDUSTRY.

In the *Annual Report* on Barbados for the year 1905-6 the following reference is made to the satisfactory progress made by the cotton industry:—

It is estimated that in 1905, 2,000 acres were under this crop, and the quantity of cotton exported was 344,232 lb. The prices obtained varied from 12½d. to 17d. per lb., and were remunerative. So satisfactory has the industry proved since it was started four years ago, that it is estimated that 5,000 acres will be planted in cotton during the coming season. Where care has been taken with the cultivation, the net return has amounted to £10 and over per acre.

At the beginning of last November, the cotton factory, which belonged to the Government and which was worked under a committee of the Agricultural Society appointed to assist the Imperial Department of Agriculture in the establishment of subsidiary industries, was transferred to the Barbados Co-operative Cotton Factory, Ltd., for £600 first-mortgage debenture bonds, bearing interest at the rate of 6 per cent. per annum, the bonds to be redeemed within twenty-one years. The new company charged ¾d. per lb. for gining and baling the lint. Owing to the increase in the cotton industry, the company has recently increased its capital by the issue of additional shares, and is at present erecting a new factory of twenty-four gins, so as to be in a position to gin all the cotton sent to the factory within a reasonable time.

BROOM CORN IN MONTSERRAT.

Reporting on the experimental cultivation of broom corn at the Montserrat Botanic Station, the Curator states that from the ½-acre plot, planted in June last, 300 lb. of dried heads were reaped in September. Mr. Robsons adds:—

The yield of dried brush is a little higher than last year, though the brush is, in some respects, not so satisfactory. On account of the plants not having been thinned out so severely as last year, they were more crowded and the heads smaller.

The larger area cultivated has enabled us to ascertain the possible difficulties that would have to be met if broom corn were grown on estates. If the heads are thrown down in heaps before the seeds are cleaned off, the latter quickly 'heat,' and the brush becomes yellow and of less value.

One of the principal difficulties would be the large amount of accommodation that would be needed to dry the brush from a large area, as this should be dried under cover and yet where there is a free circulation of air.

THE CULTIVATION OF BROOM CORN.

The following information in regard to the cultivation of broom corn is abstracted from a paper in the *West Indian Bulletin*, Vol. VII, pp. 221-5:—

Broom corn (*Andropogon Sorghum*, var. *technicus*) has been grown successfully in Antigua, Montserrat, and British Guiana, and it is possible that these experiments may lead to the establishment of a small industry. Canada offers a market for the dried brush, while brooms and hand-brushes can be sold at a profit locally.

Varieties.—Broom corn differs from other varieties of sorghum in the greater length, strength, and straightness of the fine stems which carry the florets and seeds. The highest price is commanded by long, straight, tough stems, which are bright green when dry. The Dwarf variety of broom corn produces a short brush. This is somewhat difficult to harvest. The Evergreen variety is good all round. The Mohawk variety is earlier, but the yield is smaller.

Cultivation.—Broom corn is cultivated in the same way as the well-known Guinea corn. The soil must be well drained, and in a good state of tilth. From 6 lb. to 8 lb. of seed are required for an acre. The seed should be sown in rows, 3 to 3½ feet apart. The seedlings should be thinned so as to stand three or four to a foot. The quality of the brush depends greatly on the proper distances between the plants, and these distances can be fixed only by trial. Germination and early growth being slow, weeds grow rapidly; they can be removed from between the rows with a Planet Junior plough.

Bending.—Some panicles in the field will bend to one side under the weight of seed. These must be found out before they are ripe, and the stalk bent right down so that the weight of the seed will tend to keep the stems straight as they harden.

Cutting.—If the highest price for brush is wanted, the stalks are all cut just after flowering, before the seeds have hardened. The dry brush is then green. If the seeds are required for sowing or feeding stock, the brush will have deteriorated in colour and strength by the delay. In cutting, a stalk of 6 to 8 inches must be left on each panicle. The unripe brush must not be put into big heaps before drying or it will heat and become discoloured.

Drying.—Immature brush is cleaned with a saw-tooth scraper and dried on racks in the shade. The seed is removed from mature brush by a coarse comb or a toothed seeder, and it can be dried in the sun or the shade.

Grading.—All crooked or broken brush should be discarded. The straight brush should be sorted into different lengths and these into different colours. If possible all in one bale should be of the same length.

Dwarf brush is the finest fibre and has a stalk of 4 to 5 inches. It will fetch in Montreal 25c. per lb.

Another grade has stalks of 5 to 6 inches, fine fibres, and is worth 7c. per lb. The coarsest grade has 7-inch stalks, heavy fibres, and is 18 to 30 inches long; its price is about 5c. per lb.

Baling.—Bales are of about 300 lb. and can be made in a cotton press. They may be 4 feet long, 2½ feet wide, and 2 feet deep. The butts are outside with the heads overlapping. They may be tied with fence wire.

Yield.—In the United States, up to 500 lb. to 800 lb. of brush per acre, worth \$40 to \$200 per ton. In Australia, 900 lb. to 1,300 lb. of clean brush and 25 to 30 bushels of seed per acre. The brush is worth \$90 to \$200 per ton, and the seed \$1 per 4-bushel bag.

Reference may be made to previous articles in the *Agricultural News* (Vol. IV, p. 208, and Vol. V, p. 267) dealing with the experimental cultivation of broom corn in the West Indies.

EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming, should be addressed to the Commissioner, Imperial Department of Agriculture, Barbados.

All applications for copies of the 'Agricultural News' should be addressed to the Agents, and not to the Department.

Local Agents: Messrs. Bowen & Sons, Bridgetown, Barbados. *London Agents:* Messrs. Dulau & Co., 37, Soho Square, W., and The West India Committee, 15, Seething Lane, E.C. A complete list of Agents will be found on page 3 of the cover.

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Agricultural News

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NOTES AND COMMENTS.

Contents of Present Issue.

The great possibilities of poultry raising form the subject of the editorial in this issue.

Good results were obtained on a large scale in Barbados during the last crop with seedling cane B. 376. (p. 386.) This note is followed by a statement as to the work of the central sugar mills in Queensland.

An illustration showing sisal hemp growing at the Montserrat Botanic Station appears on p. 389.

The attention of cotton growers is drawn to the information published on p. 390 in regard to the insurance of shipments of cotton from the West Indies. The 'Seasonable Notes' on the same page have reference to the effect of the recent heavy rains at Barbados on the cotton crop.

On p. 391 will be found a *résumé* of the paper on the cultivation of broom corn.

The 'Insect Notes' in this issue (p. 394) contain an account of the digger wasps and a reference to the attacks of scale insects on cotton.

A brief account of the two chief forms of agricultural credit banks which have been established in Germany appears on p. 395.

In connexion with the observation of Arbor Day at Barbados on November 9, 791 plants were distributed from the Botanic Station. (p. 395.)

Exports of Barbados.

According to the *Annual Report* on Barbados for 1905-6, the total value of the produce and manufactures of the island exported was £696,829, as compared with £627,678 in the previous year. The total was made up as follows: sugar, £451,491; molasses, £177,205; cotton, £17,211; other products, £50,923.

Owing to better prices prevailing for sugar during the early part of the year, the value of the exports of of sugar and molasses was £44,283 more than in the previous year, although the crop fell short of that of 1904, the output being 16,507 hogsheads and 5,682 puncheons, respectively, less.

The returns show a steady increase in the exports of minor products of the colony, which, in the year under review, reached £68,036. The items which principally contributed to this total are as follows: cotton, £17,211; fresh fruit and vegetables, £11,804; bananas, £6,706; manjak, £9,292; and hides, £5,375.

British Honduras Botanic Station.

In the *Annual Report* on the Botanic Station at Belize, British Honduras, for the year 1905, the Superintendent (Mr. E. J. F. Campbell) states that 7,542 plants were distributed during the year; of these, 4,600 were logwood; other plants were distributed as follows: cacao, 700; coffee, 850; and rubber, 300.

Besides the station at Belize, there are nurseries at Stann Creek and Corozal. The Superintendent also has charge of the Government House grounds.

Appended to this report are three reports from the Imperial Institute on samples forwarded by the Superintendent of the Botanic Station. These were a sample of tobacco (see *Agricultural News*, Vol. V, p. 141), and samples of cotton grown at the Corozal Station. The reports indicated that the Sea Island cotton had been grown in an unsuitable district. The Upland cottons were of a very good quality and readily saleable at 5d. to 6d. per lb.

Exports of the West Indies.

A return was presented to the House of Commons on August 1, 1906, of the average annual exports to the United Kingdom and the United States during each quinquennium ending 1904, 1899, 1894, and 1889, from the British West India Islands. The return shows how much of such exports were of sugar and molasses; how much were of fruit (fresh and dried), coffee, cacao, and tobacco; together with the proportions for each period going to the United States and the United Kingdom, respectively.

The average annual value of the total exports of the British West India Islands, during the quinquennium 1900-4, was £5,466,000, of which 26.4 represented the percentage proportion to the United Kingdom, and 47.5 to the United States.

During this period the value of the principal exports was as follows: sugar, £1,296,000; molasses £172,000; fruit, £953,000; coffee, £129,400; cacao £1,402,000; tobacco, £28,000.

Comparison of these figures with those for the five years 1885-9 shows a decline of £894,000 for sugar; of £57,000 for molasses; and of £105,600 for coffee. On the other hand, fruit has increased by £610,000, cacao by £670,000, and tobacco by £18,000. In other words, the value of the fruit exports and of those of tobacco has been nearly trebled, and that of cacao doubled.

In reference to the direction of trade, it is shown that twice as much sugar goes to the United States as to the United Kingdom. Of the fruit, 90 per cent. goes to the former and 7 per cent. to the latter.

Lime Industry in the West Indies.

Writing in the *Grenada Chronicle*, Mr. G. Whitfield Smith, Commissioner of Carriacou, draws attention to the lime industry as one likely to offer reasonable prospect of success in Grenada. Mr. Smith points out that from a small beginning the lime industry has steadily progressed and prospered till it has taken first place in Dominica and Montserrat.

He gives particulars as to the cultivation of limes and their yield 'in the hope that they may induce a systematic effort on the part of our cultivators profitably to reclaim and employ the many thousand acres which are now lying useless, and thereby to add one more item to the list of export products from this lovely colony.'

Lime trees are generally planted at 15 feet apart, or 193 trees to the acre. When in full bearing a tree will yield from 1,200 to 1,800 limes per annum. The yield of an estate, under ordinarily favourable circumstances, may be estimated at 190 barrels per acre.

Assuming that the limes are converted into raw juice, Mr. Smith's figures show that an acre will give handsome returns when prices are good. But as the market for raw juice is limited, it may be necessary to concentrate. By concentrating the juice, the planter will still obtain excellent returns. It is claimed by a successful lime planter in Dominica that 'it is an incontestable fact that it will yield the greatest returns on the capital invested of any industry in the West Indies.'

Funtumia Rubber in the Cameroons.

An article by one of the editors in the *Tropenpflanzer*, for July 1905, contains interesting information in reference to the cultivation of *Funtumia elastica* in German West Africa.

There are now in the Cameroons about 350,000 cultivated trees of this rubber, nearly 100,000 of which belong to Moliwe plantation. The trees grow rapidly in the Cameroons; the few diseases which attack rubber trees do not injure *Funtumia*, and the only hesitation felt about planting it has had reference to doubts about the earliest age at which the tree can be tapped, and its yield. As a result of a preliminary series of experiments made by the manager of Moliwe, the following points have been established:—

(a) *Funtumia elastica* yields commercial rubber

at five and a half years. Although the quality is not of the very best at this age, yet it is a useful rubber.

(b) The method of tapping which yielded most rubber was the one in which most bark was cut, a double herring-bone of fifteen cuts on each side. This produced 2½ oz. of rubber in one day. Re-opening of the cuts produced but little latex.

(c) It would pay, with labour at 9d. per day, to tap trees of this age, but would perhaps injure the trees.

The coagulation of the rubber was brought about by boiling, with the addition of acetic acid.

Agriculture in the Straits Settlements.

It is stated in the *Annual Report* on the Straits Settlements for 1905 that pine-apple cultivation has increased in Singapore even more than it did in the previous year. Over 548,000 cases of preserved pine-apples were exported, valued at over 2¼ million dollars, an increase of 100,000 cases and \$318,000.

A further extension of Para rubber planting is reported in Singapore and in Malacca. The cultivation everywhere is increasing, and the demand for seed from the Botanic Gardens is larger than can be supplied.

Considerable extension of cocoa-nut planting has also taken place. Mention is made of the phenomenal rise in copra production and the extension of the oil-extraction industry.

The output of sago was 47,788 tons, of tapioca 48,005 tons. The other principal articles of produce are gambier, pepper, coffee, hides, rattans, gutta, and gum copal.

New Source of Nitrates.

According to the *Journal of the Board of Agriculture*, for November, recent investigations on nitrification have suggested that peat, the result of the decomposition of vegetable matter in water, might prove of some importance as a source of nitrates. It has been found that when broken into pieces, mixed with lime, and treated with a weak solution of sulphate of ammonia, peat has, after the addition of the nitrifying organisms, exhibited an extraordinarily active nitrification, much surpassing that of any materials previously employed.

All kinds of peat proved very effective, but the light and spongy kinds, less advanced in decomposition, were found somewhat better. The method adopted is to saturate the peat with an ammoniacal solution, with the result that the liquid becomes nitrified. It is allowed to drain through the peat, and the nitrates are obtained by evaporation.

The investigators were also led to consider whether the peat could not furnish in addition the ammonia necessary for the operation, as it contains from 2 to 3 per cent. of its dry weight of nitrogen. They found that, by treating the peat in a current of superheated steam, they were able to extract the greater portion of the nitrogen in the peat. 'If this method of producing nitrogen proves a commercial success, it will add to our manurial resources, whereas the nitrification of sulphate of ammonia by peat is not likely to have any very direct importance for agriculture.'



INSECT NOTES.

Digger Wasps.

During a recent visit to Nevis, the Entomologist on the staff of the Imperial Department of Agriculture observed two species of digger wasps visiting the flowers of an acacia tree.

While at Richmond Lodge estate Mr. Ballou's attention was attracted by the unusual sight of hundreds of wasps of two species of the family *Pompilidae* visiting the flowers of an acacia tree growing in the estate yard. It is not unusual for these insects to visit flowers, but he had not seen them before in large numbers about a single tree, as in this instance.

The *Pompilidae* are a family of the digger wasps or *Fossores*, the various West Indian species being known as fever bees, probably on account of the very painful sting of the females, which is said to produce fever. They are solitary wasps, that is, each female builds her nest by herself, lays her eggs and stores the nest-cells with food for her young.

The two species under discussion belong to the group which make their nests in burrows in the ground, and store them with spiders. The spiders are stung in such a way as to be paralyzed, but not killed; consequently, although they cannot move, the young wasp grubs find fresh live food in the nest.

The two insects found about the acacia tree in Nevis are large, spreading about 2 inches across the wings. The legs are very long and fitted for running on the ground. One of them has a dark, velvety, bluish body, reddish wings, and dark antennae, while the other has a bluish body, with greenish reflections, greenish wings, and pale-yellow antennae. They are very striking in appearance, whether seen flying, walking, or at flowers.

The natural history of the digger wasps is of great interest, and accounts that have been published of the methods of the different species in capturing their prey, in making burrows, etc., indicate that these insects possess an uncommon amount of energy, and remarkable instincts.

The following is taken from the account of the *Fossores* given in the Cambridge Natural History, *Insects*, by Mr. David Sharp, F.R.S.:—

'The great variety in the habits of the species, the extreme industry, skill, and self-denial they display in carrying out their voluntary labours, render them one of the most instructive groups of the animal kingdom. There are no social or gregarious forms; they are true individualists, and their lives and instincts offer many subjects for reflection. Unlike the social insects, they can learn nothing whatever from either example or precept. The skill of each individual is prompted by no imitation. The life is short; the later stages of the individual life are totally different from the earlier; the individuals of one generation only in rare cases see even the commencement of the life of the next; the progeny, for the benefit of which they labour with unsurpassable skill and industry, being unknown to them. Were such a solicitude displayed by ourselves, we should connect it with a high sense of duty, and poets and moralists would vie in its laudation. But having dubbed ourselves the higher animals,

we ascribe the eagerness of the solitary wasp to impulse or instinct, and we exterminate their numerous species from the face of the earth for ever, without even seeking to make a prior acquaintance with them. Meanwhile our economists and moralists devote their volumes to admiration of the progress of the civilization that effects this destruction and tolerates this negligence.'

Scale Insects on Cotton.

The black shield scale (*Lecanium nigrum*) is again reported as doing considerable damage to cotton fields in Barbados.

Accounts of attacks of this and other scale insects on cotton have appeared in the publications of the Imperial Department of Agriculture (*West Indian Bulletin*, Vol. VI, p. 128, and *Agricultural News*, Vol. V, p. 42).

In each case so far reported and investigated, it has been found that serious injury has resulted only when some source of infection has been allowed to exist near the cotton field. In one instance, the source of infection was a badly attacked hibiscus hedge; in other cases, cotton slightly infested has been ratooned, and new crops of cotton have been planted in the adjoining fields.

Scale insects frequently occur in cotton fields without doing much damage, but it is always wrong to plant cotton in the immediate vicinity of any known source of infection. Scale-infested cotton should be cut and burned and not be allowed to stand until the neighbouring fields are attacked. Cultural methods are often far more valuable than remedial, and in dealing with insect pests it is well to remember the old saying: 'An ounce of prevention is worth a pound of cure.'

Trapping Cotton Moths.

Mr. H. A. Tempany has forwarded for publication the following account of a method adopted in Antigua by Mr. Warneford for trapping cotton moths:—

His method of working consists of standing plates of a mixture of molasses and cane vinegar in the middle of his cotton fields at a height of about 3 feet from the ground, and collecting the moths from the plates the first thing every morning. At present he uses one plate to every acre of cotton. Mr. Warneford tells me that in about three weeks he trapped 9,000 moths by this method. I went to his estate early one morning last week and saw the process at work. Two plates that I examined each contained from thirty to forty moths and apparently all were the cotton moth (*Aletia argillacea*). Mr. Warneford thinks that the method has had a distinct effect in lessening the attacks of the caterpillars on his cotton.

Mr. Holborrow has also tried this method and reports equally good results.

Gebang Palm in Dominica. The Curator of the Botanic Station in Dominica writes: 'A fine specimen of the Gebang palm of Java (*Corypha Gebanga*) has lately flowered and is now ripening its fruits at the St. Aroment estate, Dominica. The plant was sent from Kew many years ago. While this species cannot rival its close ally, the Talipot palm of Ceylon (*Corypha umbraculifera*), it is nevertheless a grand palm, and as it appears to be rare in the Lesser Antilles, this opportunity should be taken to propagate it. Dr. Nicholls has placed the seed at the disposal of the Agricultural Department, and it will shortly be ready for distribution. A good specimen of the Gebang palm, ten years old, can be seen in the Botanic Station.'



AGRICULTURAL CREDIT IN GERMANY.

In an article on the above subject, in the *Journal of the Board of Agriculture* (London, March 1906), it is stated that the spread of co-operative ideas in Germany during recent years has been very marked. The establishment of central banks, devoting themselves more or less exclusively to co-operative business, has been an important feature in this spread of co-operative ideas. The following is of interest:—

There are two classes into which the credit banks may broadly be divided: those founded on the Schulze-Delitzsch system and those based on the Raiffeisen principle. The difference between them has been frequently explained, and it will be sufficient here to indicate the distinction somewhat briefly.

SCHULZE-DELITZSCH BANKS.

The Schulze-Delitzsch Credit Societies were designed by their founder, after whom they are named, mainly for the benefit of mechanics and small tradesmen. They grant loans on promissory notes and bills for short periods of from three to nine months, and at the same time encourage their members to deposit their savings with the society. At the time of their foundation they rested on the principle of unlimited liability, but in later years limited liability was also introduced, especially as their accumulations of capital increased. Unlimited liability and self-help were, however, declared by Schulze in 1858 to be the only principles justifiable in economy, and moreover, 'particularly suitable to the character and manners of our people.' As a matter of fact, the collective liability of the members to the extent of their whole means was at that time the only system recognized by the law, but by an Act passed in 1889, the limited liability of members was admitted. A new form of unlimited liability, by which the member's risk was rendered more remote, was also introduced, but has been but little adopted.

In the Schulze-Delitzsch societies, every member subscribes a certain share of the capital, no one being allowed to exceed a certain limit. This is payable in one sum or in monthly instalments. Loans are granted to members only, without inquiry as to the purposes for which they are required, on security, which may take the form of mortgages, guarantee by another member, bills, etc. They are only granted for short terms, and this is one of the features which distinguish these associations from those on the Raiffeisen principle. Deposits are received both from members and from other persons, and these, together with the small capital, form the fund from which loans are made, while the credit due to the unlimited liability of the members enables these societies to raise any money which may be required in addition. The societies are usually established in towns, but are open to any one, regardless of place of residence.

The rate of interest on loans demanded by these banks is higher than that required by the Raiffeisen associations, and they are not so generally adapted to agricultural requirements as the latter. It would be a mistake, however, to suppose that they do nothing for agricultural credit, as, according to the figures for 1902, 28½ per cent. of the members were peasants and farmers, 24½ per cent. mechanics, and 10 per cent. merchants and dealers. The number of societies belonging to the Schulze-Delitzsch Union was 899, with 533,888 members.

RAIFFEISEN BANKS.

The loan and savings banks founded by Raiffeisen may be said to have three main objects: (1) to encourage thrift among the agricultural population; (2) to satisfy the demand for loans on personal security; and (3) to act as bankers in the country districts. They rest to an even greater extent than the Schulze-Delitzsch societies on the principle of solidarity or unlimited liability, in that, practically, no share capital is raised, the money for working the society being obtained from entrance fees, subscriptions, and deposits, and borrowed from persons outside the society on the collective security of the members. Loans are advanced only for reproductive purposes, evidence being required of a reasonable prospect of repayment at the date fixed, and they must be guaranteed by another member of the society. The operations of these societies are limited to small areas, usually a village or small town, so that the personal character and circumstances of applicants for loans may be known to the members and committee. The administration is honorary, no salaries being paid (except a trifling sum to the Secretary), and all profits realized go to a reserve fund.

ARBOR DAY AT BARBADOS.

Mr. J. R. Bovell, F.L.S., F.C.S., has forwarded the following note on the observance of Arbor Day at Barbados:—

November 9, the day set apart for the celebration of His Majesty's birthday, was observed as Arbor Day, in accordance with the proposals made last year by the Imperial Commissioner of Agriculture.

At an early date a list of plants available for free distribution, some 2,143 in number, was published in the *Official Gazette*, and the editors of the local newspapers were good enough to call attention to the fact that persons desirous of observing Arbor Day could obtain plants by applying to the Superintendent of the Botanic Station, who would be pleased to supply information for planting them to those requiring it.

The matter was energetically taken up, and applications for 816 plants were received. Of these 791 were delivered, a few of the persons who had applied for plants not sending for them.

The following is a list of the plants distributed:—

Swietenia macrophylla, 75; *Tecoma serratifolia*, 45; *Tecoma spectabilis*, 17; *Funtumia elastica*, 75; *Gliricidia maculata*, 35; *Erythrina umbrosa*, 13; *Erythrina velutina*, 9; *Platymiscium platystachyum*, 16; *Lagerstroemia Flos-Reginae*, 29; *Persea gratissima*, 11; *Cassia siamea*, 22; *Cassia multijuga*, 13; *Cassia calanthes*, 4; *Cassia grandis*, 51; *Casuarina equisetifolia*, 61. Total, 476.

PALMS.

Thrinax Morrisii, 32; *Thrinax radiata*, 13; *Thrinax barbadensis*, 23; *Thrinax parviflora*, 11; *Thrinax argentea*, 13; *Sabal blackburniana*, 13; *Sabal acaulis*, 3; *Sabal Adansoni*, 9; *Sabal Palmetto*, 36; *Washingtonia filifera*, 20; *Ptychosperma Macarthurii*, 19; *Pritchardia pacifica*, 24; *Dictyosperma album*, 5; *Corypha umbraculifera*, 10; *Livistona altissima*, 6; *Livistona chinensis*, 6; *Caryota urens*, 32; *Areca grandiformis*, 11; *Phoenix reclinata*, 3; *Phoenix dactylifera*, 10; *Phoenix acaulis*, 3; *Oreodoxa oleracea*, 2. Total, 303.

The following plants were given away in addition to those offered for free distribution in the *Official Gazette*:—

Paullinia barbadensis, 4; *Artocarpus incisa*, 2; *Psidium cattleianum*, 4; *Stephanotis floribunda*, 1; *Nerium Oleander*, 1. Total, 12.



GLEANINGS.

The Curator of the Botanic Station at Montserrat reports that two persons are planting $\frac{1}{2}$ acre each in broom corn. A $\frac{1}{4}$ -acre plot has been sown at the Botanic Station.

It is announced that there will be held in February next at Grenville an exhibition of the Agricultural and Commercial Society of Grenada, under the auspices of the Imperial Department of Agriculture for the West Indies.

Tropical Life, for November, contains a portrait of the Hon. William Fawcett, B.Sc., F.L.S., Director of Public Gardens and Plantations, Jamaica. A brief sketch of Mr. Fawcett's career is given, and reference is made to the work carried on by him in Jamaica.

In the November number of the *Journal of the New York Botanical Garden*, the Chairman of the Board of Managers of that institution, Professor S. M. Underwood, of Columbia University, reports on the tropical laboratory and station at Cinchona, Jamaica, leased in 1903 for ten years from the Jamaica Government.

The *Trinidad Mirror* for November 24, describes the San Fernando School Horticultural and Needlework Show. In addressing those present, his Excellency the Governor said that the 'rule of thumb' methods were of very little use to agriculture. In agriculture they must keep on improving all the time. There was a peasant proprietors' and an animal section at this show.

The *Port-of-Spain Gazette*, of November 21, gives an account of a School Vegetable Show, held at Arima, Trinidad, on November 20. His Excellency the Governor welcomed the new exhibit from the peasant proprietors and hoped for improvement in this section, as an evidence that the teaching of the schools had been carried on in after life.

The members of the agricultural science class in Trinidad, says the *Port-of-Spain Gazette*, of November 20, went to the Government Farm for a practical lecture on 'Management of Live Stock and Poultry,' by the Manager of the farm. Their next lecture will be delivered by the Government Veterinary Surgeon.

The *Tropenpflanzer* (October 1905) gives the following analysis of a sample of rubber obtained from five-year-old trees of *Funtumia elastica* grown in the Cameroons: moisture, 3.5 per cent.; caoutchouc (best quality), 87.2 per cent.; caoutchouc (inferior quality), 0.5 per cent.; resin, 7.1 per cent.; sand, bark, etc., 1.7 per cent. Considering that this sample was obtained from such young trees, it is of a remarkably good quality.

The three parishes to be dealt with during the current year under the prize-holdings scheme of the Jamaica Agricultural Society are St. Ann, Trelawny, and Manchester. The rules of the scheme are published in the society's *Journal*, for November.

It is stated in the report of the Government Analyst in British Guiana for the year 1905-6 that 1,747 samples of sugar and molasses, and 567 samples of sugar-canes were submitted for examination during the year. The unsatisfactory feature during the year is the high rate of adulteration among samples of milks purchased in Georgetown.

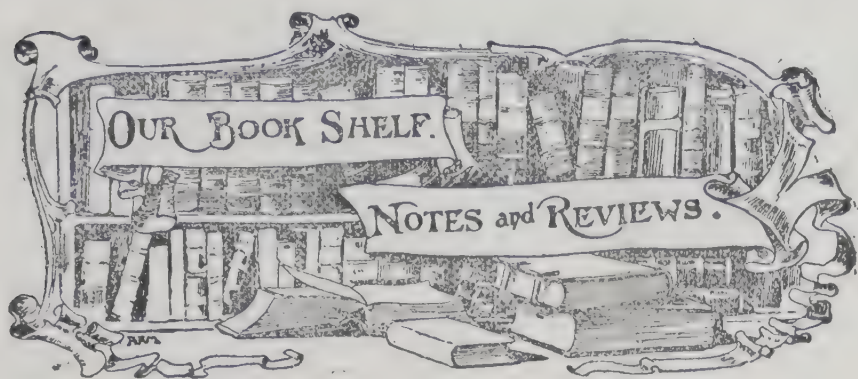
The same report, dealing with 'substances suspected to contain poison,' states that examination of two samples of 'Rough on Rats' showed that this substance is 'a carelessly made mixture of white arsenic and powdered witherite coloured by a small quantity of charcoal or similar product. Its sale appears to be a direct contravention of clause 21 (5) of the Pharmacy and Poisons Ordinance.'

To ensure that the cotton seed is well preserved from one season to another, a large St. Vincent planter is making a special seed house. Large trays have been made 20 feet long, 7 feet wide, and 7 inches deep. These are placed one above another with a good space between each to admit of a free circulation of air. The seed is also to be well turned at definite periods. It is expected that an arrangement of this kind will prevent any heating of the seed.

An editorial of the *Maritime Merchant*, Halifax, N.S., points out that the West Indies produce besides sugar other important products such as cotton, cacao, and rice, which may in fifteen or twenty years be greatly increased. Closer commercial relations between Canada and the West Indies must precede any thoughts of political union. The free passage offered by Messrs. Pickford & Black to delegates of the Boards of Trade of the principal Canadian cities is fraught with possibilities as to this 'market of the future.'

Referring to the use of polished rice (see *Agricultural News*, Vol. V, p. 285), the *Journal of the Jamaica Agricultural Society* says: 'readers will have noticed how carefully we always define what kind of rice should be used to feed chickens. We have always stated that it should be the brown rice, to be bought in the small country shops or the shops of the Chinamen in town.' The figures given to show the superiority of unpolished over polished rice appear to contain some unexplained inaccuracy. We may state, however, that Wiley (Bulletin 45, Division of Chemistry, U. S. Department of Agriculture) states that unpolished rice (mean of six samples) contains 8.02 per cent. of albuminoids, as compared with 7.18 per cent. (mean of fourteen samples) in polished rice.

At the instance of the Grenada Agricultural Society, the West India Committee in June last requested the Secretary of State for Foreign Affairs to advise His Majesty's Consuls in the chief cacao-producing countries of the world to procure the fullest and most complete information possible regarding the production of cacao and the methods of cultivation prevailing, the destination of exports, and other such matters which could prove of value to cacao planters in British possessions. As a result, the first of a series of special reports, viz., from Bahia, Brazil, appears in the last issue of the *West India Committee Circular* (November 20, 1906). This report will be reviewed in a future issue of the *Agricultural News*.



TROPICAL HYGIENE PRIMER: By C. W. Branch, M.B., C.M. Issued under the authority of the Government of St. Vincent. 1906.

This little book has been written by Dr. Branch for use in elementary schools in the West Indies.

In the simplest language children are here taught 'something of the facts which concern health protection.'

In the first chapter, dealing with general hygiene, the children will learn the uses and composition of air, foods, and water. It is explained, for example, that 'night air has no evils whatever'; therefore windows should not be closed at night. Tainted salt fish should be avoided; also the meat of an animal that has died of disease, as this may be anthrax. The value of pure water and the desirability of boiling all drinking water are insisted upon.

The second chapter deals with personal hygiene: the care of the skin, hair, and teeth; clothing, the need of exercise, and temperance are also discussed.

Next comes a chapter on some of the commonest diseases occurring in the West Indies, and this is followed by a 'Health Catechism.'

Dr. Branch has made an excellent attempt to improve the conditions under which people live in the West Indies by reaching the children in the schools. His *Tropical Hygiene Primer* should find its way into every West Indian elementary school.

RACES OF DOMESTIC POULTRY: By Edward Brown, F.L.S. London: Edward Arnold, 41 and 43, Maddox Street, W. 1906.

The author, who is Secretary of the National Poultry Organization Society and Lecturer on Aviculture at the University College, Reading, writes with the authority conferred by over thirty years' study of poultry breeding.

In the preface he refers to the increased attention being paid all over the civilized world to the breeding of poultry. To this is due the development of distinctive races; and in his book Mr. Brown has focussed 'information as to the races of poultry met with in all the countries where breeding is conducted upon advanced lines.'

For the purpose of securing reliable information as to these different races, of a large number of which it was found that little was known, the author has visited, during the last few years, the greater part of Europe.

A particularly interesting feature of this book is the attempt which is made 'to trace the origin, history, and distribution of domestic poultry, and to show the evolution of breeds and their classification.' In dealing with the origin of most of the domestic breeds, the author gives tables to indicate their descent. For example, the Black Orpington breed was originated by the late Mr. William Cook, then living at Orpington, Kent, by mating Black Minorca cocks with Black Plymouth Rock hens; with the hens resulting from this cross Clean-legged Langshan cocks were mated.

The characters of the resulting birds were then fixed by a rigorous process of selection.

The book contains an account of the origin, history, and economic characters of a very large number of European and American races of fowls; also of races of domestic ducks, geese, and turkeys. The characters of the races are further indicated by eighty-nine large illustrations. Altogether Mr. Brown's book will be found a valuable guide which all breeders of poultry are likely to find very useful.

USE OF ART PAPER IN PRINTING.

The *Printers' Register*, for June 1906, reproduces extracts 'from an extremely interesting and highly valuable paper' recently read by Mr. R. W. Sindall before the Society of Chemical Industry, on the 'Manufacture and Use of Art Paper.' As these extracts refer to the class of paper which has been adopted in printing the *Agricultural News*, the following may be of interest:—

These special papers are now made in large quantities to supply the demand for a paper having a smooth surface suitable for the printing of what are known amongst the printing craft as half-tone blocks. The coating which is applied to the ordinary paper to produce the smooth surface required consists of certain inert mineral substances, such as China clay, blanc fixe, or enamel mixed with glue or casein. Of recent years casein has been largely employed as a substitute for glue, but, as appears from the following extract, it does not seem to afford the best results:—

'The decomposition of casein in solution, even to a slight extent, diminishes its adhesive properties, and as a matter of common experience, a coating mixture prepared from casein which stands over from a Saturday to the Monday following is frequently rendered foul and useless. Inattention to details of this kind is a fruitful source of trouble, which only appears at the printing office, when it is then impossible to trace back the primary offender. The manufacturers of art papers are frequently puzzled to explain defects for which there does not appear to be any adequate cause, and this question of the alteration of adhesive properties in the prepared coating mixture is one of them.'

As to the use of art papers in the production of publications intended for long preservation as records, the following observations of Mr. Sindall should be of interest to publishers:—

'The resistance of the art paper to the ravages of time is a matter which should not be difficult to determine since all the elements for rapid depreciation are present in the shape of a large percentage of a cheap glue mixed with a common clay lying on the surface of a more or less inferior body paper, so that the moisture and damp of an ordinary atmosphere find books of this class an easy prey in course of time. The preservation of books containing the fine art illustrations obtained by process printing can be prolonged by careful storage in a properly dried room; but having regard to the large number of expensively-got-up books being continually published, this question is of the utmost importance.'

It might be added that samples of the art paper used for printing the *Agricultural News* have recently been submitted to this office, which bore evidence of deterioration and were in consequence quite unfit for printing purposes.

RUBBER TREES IN BRITISH GUIANA.

The following is a brief summary of a report by Mr. Edgar Beckett, Agricultural Instructor, on an expedition during June, July, and August last, to the north-west district of British Guiana in search of rubber-yielding trees of the genus *Sapium*:—

Mr. Beckett left Maccaseema on June 11. On June 13 he met the first *Sapium* trees. Heavy rain prevented tapping from succeeding. On June 18, at Dareh creek, he found a gigantic *Sapium* (possibly *S. Jenmani*, but no fruit or flowers could be procured to fix the species definitely) which was about 110 feet high, and 9 feet 7 inches in girth at the height of 3 feet from the ground. This tree was tapped, and in spite of the heavy rainfall, some samples of its rubber were procured. *Sapium* seedlings were not found under *Sapium* trees, since they require light and air. Some seedlings, however, were found in places where the fall of a large tree had made room for the sunlight. This is the reason, perhaps, why *Sapium* trees are not found in large numbers close together.

As the trees were just past the flowering stage, neither flowers nor seed could be obtained. The seeds are so small that they were unknown to the forest Indians, who declared that this tree bore no seed at all. Other seedlings were collected in a clearing at Arriah. Here a giant forest tree was discovered, of a kind called by the Arawak Indians Dukalliballi. It proved to be a *Ficus*, and its abundant latex yielded only resin.

On June 24, Mr. Beckett began to ascend the Shiruru. The Indians here had samples of excellent rubber, but would not show the trees from which they obtained it.

On July 8 large numbers of young *Sapium* trees were found on the Waini river at a place called 'Short Cut,' where a halt of ten days was made. It was observed that certain kinds of *Sapium* have no caoutchouc whatever in their milk. This was well known to the Indians of the district. On July 24, what appeared to be a new species of *Sapium* was discovered past Black Creek, a tributary of the Imoti.

The chief results of the expedition are:—

1. Valuable rubber trees exist in British Guiana.
2. *Sapium Jenmani* yields commercial rubber. As sold by the aborigines, its rubber is probably mixed with the resin of wild species of *Ficus*.
3. *Sapium aucuparium* was not met with in the Waini.
4. No trees of *Hevea brasiliensis* were seen, though other species of *Hevea* were met with.
5. Some kinds of *Sapium* have no rubber in their latex.

In connexion with this report it is of interest to note that the source of Colombia 'Virgen' rubber, to which reference was made in the *Agricultural News* (Vol. V, p. 311), according to the somewhat scanty materials supplied to Kew by Mr. R. B. White and Mr. R. Thomson in 1890, seemed to be a variety of *Sapium biglandulosum*. In *Kew Bulletin*, 1890-1, pp. 49-50, the following reference occurs:—

Mr. R. Thomson gives an interesting account of a tree which yields the india-rubber known in commerce as Colombia 'Virgen.' This has the peculiarity, unlike all other known sources of this substance, of growing at high elevations, and therefore in a comparatively cool climate. From the indications furnished by Mr. Robert B. White, and subsequently by Mr. Thomson, there can be little doubt that the tree is one of the multiform varieties of *Sapium biglandulosum*, a member of the family *Euphorbiaceae*, to which the trees yielding the Para and the Ceara rubbers also belong. This

widely spread and extremely variable species extends from Mexico and Panama to Colombia, Venezuela, Guiana, and Brazil. The variations which it presents in habit are probably as extreme as are to be met with in the vegetable kingdom, and it is probable that its rubber-producing qualities may be equally variable. In the West Indies it exists in forms which are probably conspecific. But though recognized as abounding in a milky juice, it has never been regarded in that region as a source of caoutchouc, at any rate in appreciable quantities.

In Schomburgk's *History of Barbados*, p. 592, *Sapium aucuparium* alluded to in Mr. Beckett's report, is mentioned as the 'Poison Tree.'

Species of *Sapium* occur in Jamaica, Grenada, Cuba, Trinidad, and other West India Islands. It might be interesting to undertake tapping experiments to ascertain if they yield commercial rubber.

AGRICULTURAL SHOW AT BARBADOS.

The seventh local Agricultural Show was held by the Imperial Department of Agriculture at Maynard's plantation, St. Peter, Barbados, by kind permission of the Hon. Dr. W. K. Chandler, C.M.G., on Tuesday, December 4.

Considering the unfavourable weather that had been experienced prior to the date of the show, and the fact that this was the first show to be held in the leeward parishes, there was, on the whole, a fair display of fruit and vegetables. The show of live stock was small, except in the case of poultry, in which department this show was an advance on previous ones. There was a large attendance.

The prizes were distributed by Lady Morris, and at the conclusion addresses were delivered by the Hon. Sir Daniel Morris, K.C.M.G., Imperial Commissioner of Agriculture, Mr. H. B. Skeete, M.C.P., the Rev. H. Hutson, and Mr. J. A. Carrington, Assistant Inspector of Schools.

In the course of his address, Sir Daniel Morris briefly explained the objects of these local shows, namely, to encourage all the small people of the island who happen to have land to make good use of it and to plant more crops likely to be of benefit to them. A further object was to encourage the raising of poultry, pigs, and sheep, and so promote the general welfare and prosperity of the people. Much more might be done in the direction of raising poultry, if greater attention were paid to the matter.

Sir Daniel Morris expressed the thanks of those present to the Hon. Dr. Chandler for lending Maynard's plantation for the purpose of the show, and also to the manager of the plantation, and to the show committee. He particularly mentioned his appreciation of the services of Mr. J. R. Bovell, who had devoted much time and trouble to the arrangements for the show.

Lockjaw or Tetanus. In the West Indies there is every year a loss in cattle and mules from this fatal disease. The microbe of tetanus is found in all soils. When earth gets into a wound, if the animal is quite healthy, the organisms of the blood prevent infection by tetanus. But if the animal is unhealthy, or if the organisms of the blood are weakened, the tetanus microbe multiplies and the symptoms of the disease appear. If a wound is at once washed out with dilute carbolic acid and then covered to prevent dirt entering, there is very little chance of the infection succeeding in establishing itself.

WEST INDIAN PRODUCTS.

Drugs and Spices in the London Market.

The following report on the London drug and spice market for the month of October has been received from Mr. J. R. Jackson, A.L.S.:—

A generally improved condition of the drug and spice market has prevailed throughout the month of October, with an upward tendency in the prices of most products. There has been no particular excitement in any West Indian product, the interest for the moment being the advance in camphor. In the general produce markets, seed oils of all kinds have risen in price, especially those of cocoa-nut and the African oil palm, the result of which has been an attempt on the part of a combine in the soap trade to raise the price of that article. The following references to West Indian products have been made during the month:—

GINGER.

At the first auction, on October 3, 340 barrels of Jamaica were offered, and 80 sold at from 54s. to 65s. On the 17th., out of a total of 94 barrels of Jamaica offered 11 were disposed of. On the 24th., only 50 barrels of common dark Jamaica were offered and bought in at 58s.; some 580 packages of Cochin and Calicut were also offered, only 18 bags selling, the remainder being bought in. On the last day of the month, the auction was very quiet; there was no demand for any kind, and no Jamaica was offered.

NUTMEGS, MACE, AND PIMENTO.

At the first spice sale there was a large supply of West Indian nutmegs offered, which met with a good demand, 340 packages finding buyers at steady rates, especially with medium and bold sizes; small sizes ranged from $\frac{1}{4}d.$ to $\frac{1}{2}d.$ per lb. lower. On the 10th., the market was quiet but steady, and a week later West Indian continued to have a steady sale, being in good demand at slightly increased rates, while Singapore were easier. On the 24th., 46 packages of West Indian were offered and disposed of at somewhat easier rates; on the 31st., cheaper rates prevailed all round, 100 packages of West Indian, Penang, and Singapore being disposed of without reserve.

Of mace, the month opened with large offerings of West Indian, which were sold at $\frac{1}{2}d.$ to $1d.$ per lb. decline on previous rates. On the 17th., there was a steady sale, fair to good palish West Indian realizing 1s. 5d. to 1s. 6d. No change occurred in this spice at the last two sales.

Pimento at the first sale realized $2\frac{3}{4}d.$ per lb. for good greyish, at which rate 210 bags were sold. A week later 110 bags were disposed of at slightly easier rates. Little or no change occurred in these prices at succeeding sales.

ARROWROOT.

On the 3rd., 135 packages of St. Vincent were offered and bought in at $3\frac{1}{2}d.$ per lb. Privately, sales were made at $2\frac{3}{8}d.$ to $2\frac{3}{4}d.$ for manufacturing qualities, the quotations for fair being $3d.$ and for fine manufacturing $3\frac{1}{2}d.$ to $4d.$

KOLA, LIME JUICE, TAMARINDS, ETC.

At the first auction, 4 packages of West Indian kola nuts were offered, 3 of which were disposed of at 1s. per lb. for green, and $2\frac{1}{2}d.$ to $2\frac{3}{4}d.$ for dried. A week later the prices had declined, 6 bags of West Indian being sold at $5\frac{3}{4}d.$ for green, and $2\frac{3}{4}d.$ for dried. Mouldy to slightly mouldy dark Jamaica, of which 55 barrels were offered, were held at $3d.$ per lb. On the 24th., 10 bags of dry West Indian

realized $3d.$ per lb., $2d.$ per lb. being paid for dark mouldy, and $2\frac{3}{4}d.$ for fair bright West Indian. Good bright washed Grenada was bought in at $3\frac{3}{4}d.$ per lb.

On the 24th., 8 puncheons of lime juice were offered and quickly sold at 1s. per gallon for 4 puncheons of good pale raw Jamaica, and for the other 4 puncheons of somewhat inferior quality $10\frac{1}{2}d.$ was paid.

Of tamarinds, some 20 barrels of fair syrupy West Indian were sold, on the 10th., at 13s. in bond. At the same sale, fair West Indian distilled oil of lime was held at 2s. 9d. per lb., and was again offered on the 31st., the prices ruling being from 2s. 3d. to 2s. 4d., and for hand pressed 2s. 9d. per lb. It was stated at the market that some 36 packages from Dominica and 43 from Barbados had arrived during the week.

Five bales of Canella alba bark in roughish pale quills were offered in the middle of the month at 65s. per cwt. and on the 25th., 12 packages of Cassia Fistula, described as 'fair fresh Dominica pod, sugar drainage damaged,' fetched 20s. per cwt. At this sale one small box of St. Vincent musk seed realized $2d.$ per lb.

CALABASH PIPES.

It is stated in the *U.S. Monthly Consular Reports*, for November, that pipes made from a gourd (calabash) have come into general use in South Africa:—

Smokers who have used the calabash pipe agree that it gives a special softness of flavour that pipes of no other material offer. I believe this to be so, and that the demand for such a pipe in the American market would be very large. The calabash should be grown in the United States, and to this end, seed is promised this office, which, when supplied, will be transmitted for the Department of Agriculture. I am forwarding a specimen of a calabash pipe in a half-completed stage and a finished pipe. The calabash pipe industry is proving a very remunerative one here in Cape Colony, both to the growers of the calabash and those engaged in making it into pipes, and also to the retail sellers. It grows in certain sections of Cape Colony with little difficulty, but seems to demand a very hot and dry climate, with rain at the right season of the year, in order to reach perfection. The curved stem end of the vegetable forms a light and appropriate shape for pipes. It colours like meerschaum and will take a high polish. The life of one of these pipes is about that of a French briar-wood pipe. The usual lining is plaster of Paris, called by the trade meerschaum. A cheap grade is lined with tin. These pipes sell from 97c. to \$62, according to type of finish. Pipe mounting and fitting being cheaper in England than here, large shipments are made to England for mounting and returned here for sale.

The industry is being crippled here by the growers refusing to sell the seeds of the calabash. It is extremely difficult to obtain them from any source. The crop last year was estimated at 60,000, and this year at about 150,000, but next season's prospects are not so good. An American business man here tells me that he has recently purchased some 20,000 calabash gourds from Cape Colony farmers for exportation—presumably in incompleting pipe formation—to the United States.

The Imperial Commissioner of Agriculture is endeavouring to obtain further information as to the gourd referred to, also seeds for trial in the West Indies.

MARKET REPORTS.

London,—November 20, 1906. Messrs. KEARTON, PIPER & Co.; Messrs. E. A. DE PASS & Co., November 16; 'THE WEST INDIA COMMITTEE CIRCULAR,' November 20; 'THE LIVERPOOL COTTON ASSOCIATION WEEKLY CIRCULAR,' November 23; and 'THE PUBLIC LEDGER,' December 17, 1906.

ALOES—Barbados, 15/- to 60/-; Curaçoa, 18/- to 55/- per cwt.

ARROWROOT—St. Vincent, $2\frac{1}{4}d.$ to $2\frac{3}{4}d.$ per lb.

BALATA—Sheet, 1/5 to 2/-; block, 1/6 to 1/7 per lb.

BEES'-WAX—£7 10s. to £7 15s. per cwt.

CACAO—Trinidad, 75/- to 82/- per cwt.; Grenada, 66/- to 72/- per cwt.

CARDAMOMS—Mysore, 11d. to 3/- per lb.

COFFEE—Jamaica, good ordinary, 42/- per cwt.

COTTON—Medium fine, 6.45d.; West Indian Sea Island, good medium 14½d.; medium fine, 15½d.; fine, 17d.; extra fine, 22d. per lb. Prices paid, 4.75d. to 8.50d. per lb.

FRUIT—

GRAPE FRUIT—7/- to 10/- per box.

BANANAS—Jamaica, 4/- to 4/6 per bunch.

LIMES—3/- to 3/3 per box of 200.

ORANGES—8/- to 10/- per box.

PINE-APPLES—St. Michael's, 1/6 to 3/4 each.

FUSTIC—£4 to £4 10s. per ton.

GINGER—Jamaica, ordinary to good ordinary, 57/- to 59/-; middling, 63/- to 64/- per cwt.

HONEY—Darkish fluid, 20s. to 20s. 6d. per cwt.

ISINGLASS—West Indian lump, 1/8 to 2/2; cake, 1/- to 1/1 per lb.

KOLA NUTS—2½d. to 6d. per lb.

LIME JUICE—Raw, 10d. to 1/2 per gallon; concentrated, £22 5s. to £22 10s. per cask of 108 gallons; hand pressed, 3/6 per lb. Distilled Oil, 2/4 per lb.

LOGWOOD—£4 to £4 15s.; roots, £3 10s. to £4 per ton.

MACE—good pale, 1/6; fair to good red, 1/3 to 1/4 per lb.

NITRATE OF SODA—Agricultural, £12 12s. 6d. per ton.

NUTMEGS—58's, 2/3; 68's, 1/2; 76's, 1/-; 90's, 8d.; 106's, 6½d.; 120's, 5¼d.; 130's, 5¼d.; 154's, 5d. per lb.

PIMENTO—Fair, 2½d. to 2¾d. per lb.

RUM—Jamaica, 2/2 per proof gallon.

SUGAR—Yellow crystals, 16/- to 17/6 per cwt.; Muscovado, 14/- to 15/- per cwt.; Molasses, 11/- to 11/6 per cwt.

SULPHATE OF AMMONIA—£12 7s. 6d. per ton.

St. Kitt's, St. Thomas, and St. Croix, dry flint, 49c. to 51c. per lb.

GRAPE FRUIT—Jamaica, \$1.25 to \$2.00 per box.

Honey—No quotations.

LIMES—No quotations.

MACE—33c. to 36c. per lb.

NUTMEGS—85's to 90's, 17c.; 95's to 100's, 14½c.; 105's to 110's, 13½c.; 115's to 120's, 12c.; 120's to 140's, 11c.

ORANGES—Jamaica, \$1.50 to \$2.00 per box.

PIMENTO—5c. per lb.

SUGAR—Centrifugals, 96°, 3½c.; Muscovados, 89°, 3½c.; Molasses, 89°, 3½c. per lb., duty paid.

INTER-COLONIAL MARKETS.

Barbados,—December 3, 1906.—Messrs. T. S. GARRAWAY & Co., and Messrs. JAMES A. LYNCH & Co. December 10, 1906.

ARROWROOT—St. Vincent, \$4.50 to \$5.00 per 100 lb.

CACAO—\$13.00 to \$15.00 per 100 lb.

COCOA-NUTS—\$12.00 per M. for husked nuts.

COFFEE—\$10.50 to \$12.00 per 100 lb.

HAY—85c. to \$1.20 per 100 lb.

MANURES—Nitrate of soda, \$65.00; Ohlendorff's dissolved guano, \$55.00; Cotton manure, \$42.00; Cacao manure, \$42.00 to \$45.00; Sulphate of ammonia, \$75.00; Sulphate of potash, \$67.00 per ton.

ONIONS—Madeira, \$5.00 per 100 lb.

POTATOS, ENGLISH—Nova Scotia, \$1.92 per 160 lb.

RICE—Ballam, \$6.15 per bag (190 lb.); Patna, \$3.00 to \$3.75; Rangoon, \$2.70 to \$2.75 per 100 lb.

SUGAR—No quotations.

British Guiana,—December 8, 1906.—Messrs. WIETING & RICHTER.

ARROWROOT—St. Vincent, no quotations.

BALATA—Venezuela block, 25c.; Demerara sheet, 38c. per lb.

CACAO—Native, 12c. to 13c. per lb.

CASSAVA—60c. per barrel.

CASSAVA STARCH—\$5.25 per barrel.

COCOA-NUTS—\$10.00 to \$12.00 per M.

COFFEE—14c. per lb.

DHAL—\$4.40 to \$4.50 per bag of 168 lb.

EDDOS—64c. to 96c. per barrel.

MOLASSES—16½c. per gallon.

ONIONS—Madeira, 4c. to 4½c. per lb.

PLANTAINS—20c. to 40c. per bunch.

POTATOS, ENGLISH—Nova Scotia, \$2.50 to \$3.00 per barrel.

POTATOS, SWEET—Barbados, \$1.44 per bag.

RICE—Ballam, \$6.10 per 177 lb.; Creole, \$4.50 to \$4.75 per bag (ex store).

SPLIT PEAS—\$6.10 to \$6.20 per bag (210 lb.).

TANNIAs—\$1.68 per barrel.

YAMS—White, \$2.00; Buck, \$2.00 per bag.

SUGAR—Dark crystals, \$2.00 to \$2.15; Yellow, \$2.50 to \$2.60; White, \$3.50 to \$3.60; Molasses, \$1.40 to \$1.75 per 100 lb. (retail).

TIMBER—Greenheart, 32c. to 55c. per cubic foot.

WALLABA SHINGLES—\$3.00, \$3.75, and \$5.25 per M.

Trinidad,—December 8, 1906.—Messrs. GORDON, GRANT & Co.

CACAO—Ordinary to good red, \$18.00 to \$18.25; estates, \$18.50 to \$19.00 per fanega (110 lb.); Venezuelan, \$18.00 to \$18.50.

COCOA-NUTS—\$21.00 per M., f.o.b.

COCOA-NUT OIL—75c. per Imperial gallon (cask included).

COPRA—\$4.25 per 100 lb.

DHAL—\$4.30 to \$4.40 per 2-bushel bag.

ONIONS—\$2.50 to \$3.00 per 100 lb. (retail).

POTATOS, ENGLISH—60c. to \$1.20 per 100 lb.

RICE—Yellow, \$5.50 to \$5.75; White, \$5.50 to \$6.00 per bag.

SPLIT PEAS—\$5.60 per bag.

SUGAR—Grocery, \$2.50 to \$2.75; molasses, \$2.00 to \$2.25 per 100 lb.

Montreal,—September 14, 1906.—Mr. J. RUSSELL MURRAY.
(In bond quotations, c. & f.)

COCOA-NUTS—Jamaica, \$26.50 to \$28.50; Trinidad, \$25.00 to \$26.00 per M.

COFFEE—Jamaica, medium, 10c. to 11c. per lb.

GINGER—Jamaica, unbleached, 16c. per lb.

MOLASCUIT—Demerara, \$1.00 per 100 lb.

MOLASSES—Barbados, 26c. to 27c.; Antigua, 21c. per Imperial gallon.

NUTMEGS—Grenada, 110's, 18c. per lb.

PIMENTO—Jamaica, 6½c. per lb.

SUGAR—Grey crystals, 96°, \$2.50 per 100 lb.

—Muscovados, 89°, \$2.00 per 100 lb.

—Molasses, 89°, \$1.75 per 100 lb.

New York,—November 30, 1906.—Messrs. GILLESPIE BROS. & Co.

CACAO—Caracas, 17c. to 19c.; Grenada, 15½c. to 16c.; Trinidad, 17c. to 18c.; Jamaica, 14½c. to 15½c. per lb.

COCOA-NUTS—Jamaica, \$33.00 to \$34.00; Trinidad, \$31.00 to \$32.00 per M.

COFFEE—Jamaica ordinary, 8¼c. to 8½c.; good ordinary, 8¾c. per lb.

GINGER—Dark scraggy root, 10c. to 11c.; small to bright bold, 12c. to 14c. per lb.

GOAT SKINS—Jamaica, Antigua, and Barbados, 61c.;



A FORTNIGHTLY REVIEW
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West Indian Agricultural Conference, 1907.

THE present indications are in favour of the Conference at Jamaica proving one of the most successful of any yet held in these colonies. Owing to difficulties with the mail service connecting with the Northern Islands, the list of

representatives is not yet complete. It is evident, however, that all the principal colonies, including British Guiana, Trinidad, and Barbados, will be fully represented. The Jamaica representatives comprise all the principal persons interested in agriculture.

As regards the subjects to be dealt with, as on previous occasions, the circumstances of the sugar industry will be first discussed. The results of recent experiments in regard to seedling canes and also in connexion with the use of natural and artificial manures are of an interesting character. Fortunately, at the present time, the diseases of the sugar-cane are not of an urgent character. The raising of pedigree canes, as a new subject, will receive special attention.

Next in order of importance is the cacao industry. There are numerous points connected with this that deserve consideration. Although the diseases attacking cacao trees are not of a markedly pronounced character, yet their general distribution in all the islands is naturally a source of anxiety to cacao planters, and it is desirable that a full exchange of views should take place in order that precautions may be adopted, and the necessary machinery may be at hand, for effective use.

The very promising outlook for the lime juice industry is responsible for a good deal of attention being devoted to it. The manufacture of citrate of lime has been taken up on commercial lines at Dominica and Montserrat, and it is probable that information in regard to what promises to be a new enterprise of some importance will be presented and discussed.

There are few subjects attracting more attention just now than the outlook for supplies of raw India rubber to meet the increasing demand for this article. Sources of new supplies of rubber are being investigated, as well as the prospects for cultivating rubber trees with the view of supplementing the supply from wild trees. Possibly the largest experiments in cultivating rubber in the West Indies are being undertaken at Trinidad and Tobago. A good deal of interest is also being taken in exploring portions of British Guiana for indigenous rubber trees and in starting regular plantations. The three principal trees that are being introduced into cultivation are the Para rubber (*Hevea brasiliensis*), the Castilloa rubber (*Castilloa elastica*), and the West African rubber (*Funtumia elastica*). The relative merits of these are still being keenly discussed. In this part of the world *Castilloa elastica* is more largely planted than any other. This is no doubt due to the fact that it is a native of tropical America and that supplies of seed are available in large quantities. In spite of this, however, discussion continues as to the best methods for cultivating this tree and as to the conditions under which it should be placed to produce remunerative results. Also whether, under all circumstances, it is a suitable tree to be used as shade for cacao.

The Sea Island cotton industry has assumed such proportions that it will be sure to receive the attention it deserves. The indications at present are that it is not suited to the conditions existing in all these colonies. That is a fact that must be fully realized. The best results, so far, have been obtained in localities where there is a moderate rainfall and where a supply of suitable labour is available for careful cultivation and for picking the cotton at the right stage.

In recent years the improvement of stock has received considerable attention. In spite of the large sums that have been expended in the purchase of pedigree animals, it is evident that a good deal more might be done in the selection of the right class or breed of animals to suit special circumstances. In connexion with this subject, the occurrence of anthrax and the treatment of ticks and other diseases also deserve to be discussed. Hitherto the improvement of stock does not appear to have been adequately considered, taking into account its bearing on the success of nearly all agricultural industries.

Agricultural education both in elementary and secondary schools is proposed to be an important topic at the Jamaica Conference. Notwithstanding

all that has been written and said on the subject, it is felt in many quarters that we are still a long way from having attained to the standard set forth when these Conferences were started. It is probable that opportunities will be given for a full discussion of the situation as now existing, and it is hoped that useful suggestions will be offered in regard to the future of educational efforts in these colonies and that a scheme will be elaborated that will bring the younger generation into closer sympathy with the chief business of their lives—namely, the cultivation of the soil.

Apart, however, from the varied and important business that will be brought before the Conference, a visit to Jamaica cannot fail to be of considerable interest to members owing to the rich and varied resources of the island and the favourable opportunities that will be offered to visitors to become acquainted with numerous industries likely to be new to them, such as pen-keeping, dairying, coffee curing, the cultivation of pimento or Jamaica pepper, tobacco, including the manufacture of cigars and cigarettes, the preparation of cassava starch, and a large and profitable bee-keeping industry.

The Reception Committee, of which the Hon. H. C. Bourne, C.M.G., is Chairman, has issued a memorandum containing notes and suggestions for excursions into various districts of the island. Amongst the excursions in contemplation are: A trip to the parish of Clarendon to study the cultivation of bananas, sugar-cane under irrigation, cotton and citrus plants; and a trip to Spanish Town and neighbourhood to observe the cultivation of bananas, citrus fruits, rubber, and sugar. Other trips under consideration are: To Mandeville and district to see horses and cattle; to Barossa, to see a well-organized creamery; and to the parish of Hanover to see Indian cattle at Shettlewood, and Hereford cattle at Knockalva. An interesting visit will be arranged to the Botanic Gardens at Castleton, by way of the Wag Water Valley, one of the headquarters of tobacco growing. The cigar and cigarette factories are in Kingston. A visit to these is probable. One or more visits are also in contemplation to the beautiful Hope Gardens in the neighbourhood of Kingston; and to Norbrook, near Constant Spring Hotel to see a successful pine-apple plantation and a recently established fruit-canning factory.

Information in regard to other excursions to places of interest will be announced by the Reception Committee after the arrival of the Representatives at Jamaica.



SUGAR INDUSTRY.

Seedling Canes in British Guiana.

In continuation of the statement published in the *Agricultural News* (Vol. V, p. 99), giving the results of the cultivation of seedling canes as compared with the Bourbon on plantation Diamond, British Guiana, for the year 1905, Mr. John Fleming, the manager, has kindly supplied the following returns for 1906:—

Canes.	Acreage.	Tons of Sugar.	Average Returns per acre.
Seedlings ...	3,233	9,580	2.96
Mixed varieties	272	680	2.50
Bourbon ...	2,495	6,040	2.42
Total ...	6,000	16,300	2.716
Seedlings better than Bourbon by 22 per cent.			

Mr. Fleming adds: 'Of B. 208, 1,755 acres were cut, with an average of 3.01 tons of sugar per acre. Bourbon at Diamond is being rapidly replaced by other selected varieties.'

Seedling Canes in Jamaica.

In his report on the Government Laboratory for the year 1905-6, Mr. Cousins refers to work in connexion with the raising of seedling canes as follows:—

The canes in the Experiment Station (8 acres) are used for providing a supply of new varieties of canes for the public and for the raising of new canes from seed. Some 3,000 seedlings yearly are now being selected for further trial by elimination of inferior canes. About 100,000 tops of selected varieties were distributed during the year under review.

The seedlings B. 208, B. 147, and D. 95 have each given excellent results on different soils. B. 208 appears to be the most promising variety for general cultivation in Jamaica.

Jamaica Sugar Experiment Station.

The following is extracted from the report on the Government Laboratory in Jamaica for the year 1905-6:—

Despite the large amount of time and work that has been devoted to experimental investigations in rum manufacture, the number of samples dealt with by the sugar laboratory shows a marked increase.

The department has supplied three chemists and a suitable laboratory equipment for certain estates or groups of estates in St. James, Westmoreland, and Vere.

In St. James, the work has been, mainly, that of improving the rum; in Westmoreland, three estates are standardizing their rum crop at a liberal standard of ethers. All consignments are analysed and controlled so that the estates can guarantee a certain standard of ethers in the rum.

In the face of recent prosecutions in the United Kingdom and a demand on the part of buyers for rum of a good standard of ethers, this effort should prove of advantage.

A grant of £100 from the Sugar Experiment Station funds was authorized for equipping a laboratory at the new central factory in Vere.

As the result of this line of development fewer samples of juices and sugars have been sent to the laboratory from estates, and it is hoped that as our work extends, a considerable increase in the number of estates employing a chemist may be effected.

The chief interest of the year has been centred in the manufacture of rum and a considerable number of samples have been sent by various estates for analysis.

We have now information as to the ether content of most of the rums produced in the island, but it is to be regretted that a complete survey of all rums exported could not be carried out owing to the objection of certain estates to this course. The standardization of Jamaica rum has now become a burning question, and, despite the difficulties involved, I am of opinion that it would prove of direct benefit to the industry as a whole.

Our experiments in the distillery are being continued, and a good many samples of materials have been analysed. A detailed report of the first series of experiments has been published in the Annual Report of the Sugar Experiment Station for the current year.

A large number of Brix saccharometers were imported for the use of estates. Each instrument has been tested, and tables giving a reading correct to a tenth of a degree at different temperatures have been prepared for each spindle.

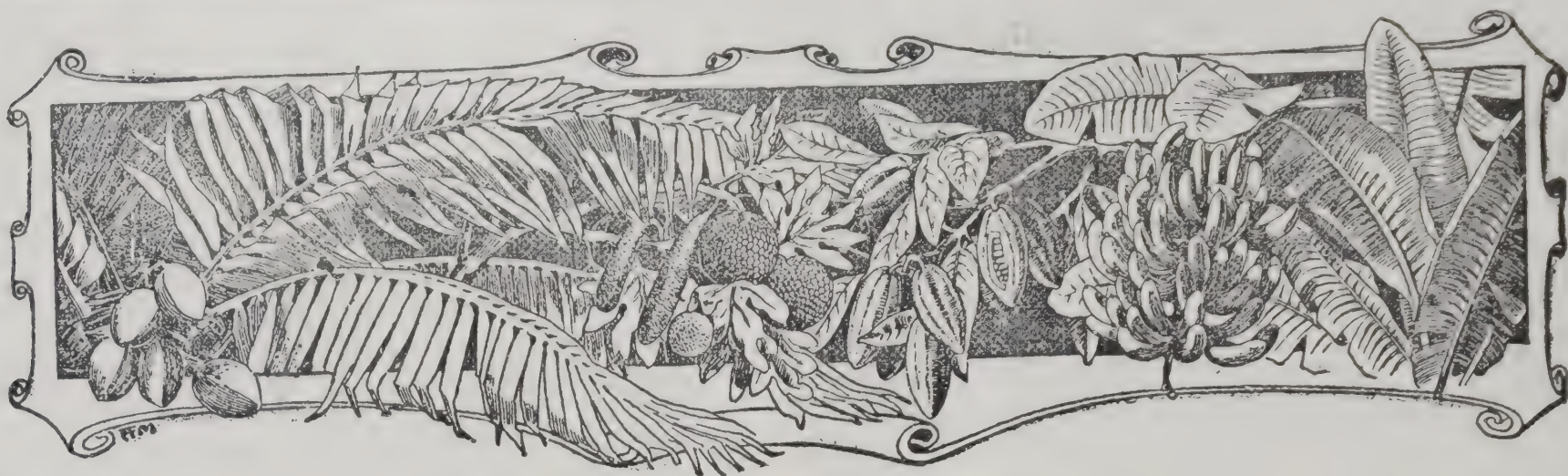
THE TURTLE TRADE OF THE WEST INDIES.

The *Scientific American*, for November 17, contains an illustrated article on the West Indian turtle trade.

The headquarters of this trade are at Kingston in Jamaica. Most of the turtle fishing is done on the coral reefs to the north of the island. Twelve or fifteen small schooners and upwards of 120 men are employed. Nets are stretched from rock to rock. The turtles when caught are brought to Kingston and kept in palisaded enclosures. They are fed on a marine plant called turtle grass.

The turtle (*Chelonia Mydas*) rarely weighs more than 180 lb. The entire British trade is in the hands of one London dealer. He regulates the market by not importing more than 100 turtles a fortnight.

Bringing the turtles over seas is a delicate business; sometimes 105 out of 120 have died on the passage, in spite of the most elaborate precautions adopted on the mail steamers, such as the daily spraying with sea water, and the use of tins of hot water to keep them from cold in the wagons conveying them from port to the dealer's warehouse. Most of the turtles are sold in advance to restaurants. About 3,000 are imported into England every year. The wholesale prices are from 10d. to 1s. 0½d. per lb. The turtle trade is busiest in the winter season. The famous turtle soup is made from the membranes of the stomach and back-shell. The shell of this turtle (green turtle) is worth but little. Tortoise shell is obtained from the hawks-bill turtle, and the shell of a good specimen may be worth £9. A great industry is growing up in tinned and bottled turtle products. These are used by invalids and by explorers in malarial countries like the West Coast of Africa. Turtle soup has been found a very powerful restorative in cases of debilitating fever.



WEST INDIAN FRUIT.

ORANGES AND GRAPE FRUIT IN CUBA.

Mr. F. S. Earle, late Director of the Agricultural Station, writes as follows in the *Cuba Review* on the best varieties of oranges and grape fruit for cultivation in Cuba:—

The two oranges that have so far given the most uniform satisfaction are Pine-apple for early and Valencia for late. They are both of very good flavour and are smooth and attractive in appearance.

The Navel or 'seedless,' as it is so often called, must still be placed in the doubtful list. The indications are that it will be sufficiently fruitful and that on some soils at least it will be thin-skinned and of sufficiently good quality. In other localities it shows a tendency to be coarse in texture and poor in quality. It will doubtless do better as trees get a little more age and as growers learn better how to manage and fertilize it. Here, in most seasons, it ripens very early and it gets sweet enough to be quite good to eat long before it colours. In fact, failure to colour properly promises to be one of its failings.

Parson Brown has been planted considerably for an early orange. It seems to have little to recommend it except its earliness. The quality is only fair and it has only a short shipping season, and in some years it has exhibited an alarming tendency to develop a brown rot at the blossom end.

The Pine-apple is a much better orange in every way and is nearly as early. Many other oranges are being planted in an experimental way, but as yet no positive opinion can be formed of them.

The Dancy Tangerine is probably the best of the 'kid glove' class. It comes into bearing early and bears very heavily, but the trees do not seem to be quite so vigorous as would be desirable.

GRAPE FRUIT.

Of the grape fruits, Marsh's Seedless and Duncan are probably being planted more than any others. Both are good, thrifty trees and come into bearing young. The Marsh runs a little small, but as the market developed last winter this may not prove to be a disadvantage. It is nearly, though not quite, seedless. The Duncan is a large, handsome fruit and is a little better flavoured than the Marsh. There are also some local kinds of great value that are beginning to attract attention and are being propagated by some. Too much cannot be said in regard to the superior quality of Cuban grape fruit. The flavour for some reason is milder and richer here than in either Florida or California. When fully ripe they may be eaten out of hand like an orange,

without the need of sugar. They are already attracting the favourable attention of the market, and there seems room for a very large development of the Cuban grape fruit industry. They hang on the tree after ripening much better than the orange and are much safer to ship and handle. Fruit that is fully ripe in November will hang on the trees uninjured till May or June, thus giving a great advantage in marketing.

APPLE BANANA.

The apple banana, with a slightly acid flavour, is commonly grown in some of these islands, especially in St. Lucia, Dominica, and Grenada. The Spanish name is Mansana.

The plant is usually very tall, 13 to 17 feet high, and on that account is liable to be injured by high winds. The individual fruits or fingers are smaller than the Chinese or Dwarf banana, but larger than the Silk or Ladies finger. A fine hand of the Apple banana, containing forty-one fingers, grown at Barbados, was recently forwarded to the Imperial Commissioner of Agriculture by Dr. R. A. Stoute. This may possibly be the highest number of fingers on one hand yet on record.

It may be mentioned that the production at the Tobago Botanic Station of a bunch of the Apple banana, weighing 100 lb., was recorded in the *Agricultural News*, Vol. III, p. 348.

ORANGE WINE.

A new product is announced from St. Vincent in the form of 'orange wine.' This has been prepared by Mr. W. C. Forde from juice expressed from oranges grown in the island, and is described as 'an invigorating, delicious, and refreshing beverage.'

Commenting on this enterprise as worthy of local support, the *St. Vincent SENTRY* says:—

Apart from the economic view, the deliciousness of the beverage appeals to the taste, and an unprejudiced trial by the public will very probably result in the permanency of their patronage. Sir Daniel Morris, the Imperial Commissioner of Agriculture, remarking on a sample bottle which was submitted to him, whilst admitting the wine to be 'palatable and refreshing,' speaks encouragingly of it, and 'trusts that Mr. Forde will be able to make a profitable industry of it.'

CHILLIES OR CAPSICUMS.

The following is an abstract of a paper by Mr. W. R. Buttenshaw, M.A., B.Sc., in the *West Indian Bulletin*, Vol. VII, p. 213:—

Chillies belong to the same order of plants as the English potato, tomato, egg-plant, and tobacco. Their generic name is *Capsicum*. Their red or yellow fruits contain a pungent alkaloid, capricine. Besides their employment as a spice, they are utilized in medicine. The true peppers, which produce the black and white peppers of commerce, are in no way related to the capsicums. The fruit of the latter is a berry of varied shape, often hollow. Most wild capsicums are natives of tropical America.

Five common forms are known locally in the West Indies as—red or guinea pepper, spur or shrubby pepper, bonnet pepper, bird pepper, and bird's-eye pepper.

Uses of Capsicums.—Capsicums, fresh or otherwise, find their chief employment as a condiment, for which the Nepaul capsicum is the most esteemed. They are employed in medicine as local stimulants, in the form of gargles and liniments, and as digestives.

Cayenne pepper is made by drying and grinding the smaller pungent varieties. It is sometimes baked into cakes with wheat flour and reground.

Production of Capsicums.—Formerly the capsicum market was chiefly supplied by Sierra Leone, Natal, and India. Now supplies are largely obtained from Zanzibar and British East Africa. Capsicums are grown in enormous quantities in the East Indies; but the consumption of the condiment is universal in India and China, and not much is exported. The cultivation of chillies is an industry of some importance in the island of Zanzibar. The exports during the past ten years have been of the annual value of about £8,000.

The cultivation of red peppers is practically confined to the eastern portion of Zanzibar, being carried on by the 'Wahadimu'—the original inhabitants. As the soil seems particularly suitable to this crop, it appears to be unfortunate that greater attention is not paid to the cultivation of chillies. As it is, very little trouble is taken in preparing the product for the market, with the consequence that Zanzibar chillies have fetched the poorest prices (viz., only 30s. to 31s. per cwt.) of any on the market. The growers frequently allow the ripe pods to drop to the ground, where they may lie for some days before being collected. Further, no attempt is made to free the pods of stalks, dried leaves, or earth, which may be adhering to them. If the pods were stalked and the dirt removed, it is probable that the Zanzibar product would realize some 15s. per cwt. more. This was shown by a shipment made by the Agricultural Department from an experiment plot of about 3 acres; the sample was reported to be far superior to the ordinary Zanzibar product.

The pepper grown in Zanzibar is *Capsicum minimum*, the bird's-eye pepper. When the season is over, the bushes are cut down to a foot from the ground for a second growth. The small Zanzibar chillies were exported from Uganda in 1904-5 to the value of £4,383. They are also being exported from British Central Africa.

Capsicums in the West Indies.—A $\frac{1}{10}$ -acre plot was planted with Natal capsicums at the Antigua Botanic Station in August 1904. It was reaped from November to March, and yielded 113 $\frac{3}{4}$ lb. undried. Ordinary red peppers and the yellow Nepaul were planted at the Nevis Botanic Station on $\frac{1}{10}$ acre. The crop was dried, and 64 lb. of dry Nepaul peppers were sold in London at £2 11s. per cwt. A barrel of dry Nepaul peppers sent later sold at £4 per cwt.

Cultivation of Capsicums.—In the West Indies they only require ordinary care. The land should be ploughed, forked, and, if necessary, manured. The seeds are sown in a seed-bed, and the seedlings transplanted readily. They should be set out at about 2 feet by 2 feet. Weeding, watering, and moulding up may all be required. The fruit begins to ripen in about four months.

Drying.—The fruit is picked when quite ripe and dried quickly in trays by sun and wind. They lose about 70 per cent. of their weight on drying, about 2 per cent. by the removal of their stalks before shipping, and 6 or 7 per cent. more by the removal of discoloured specimens.

The capsicum is very suitable for peasant proprietors to cultivate and dry for export.

SCIENCE NOTES.

Scion and Stock.

The following note regarding the influence of scion on stock in grafting appeared in the *Botanical Gazette*, for November 1906:—

By grafting *Nicotiana Tabacum* on *N. affinis* (which contains little or no nicotin), and *N. affinis* on *N. Tabacum*, Grafe and Linsbauer have succeeded in showing, in a more convincing way than before, the effect of the scion on the stock in respect to products of metabolism. Nicotin was found abundantly in *N. affinis*, whether it was functioning as stock or scion. Indeed, it attained almost the maximum amount found in *N. Tabacum* and scarcely fell below the limits of variation in that species. When *N. Tabacum* was the stock, and the scion, *N. affinis*, was cut away completely, the new shoots produced contained even less nicotin than the *N. affinis* leaves had; so that the authors believe the scion had even increased the capacity of the *N. Tabacum* stock to form this alkaloid. Further researches are in progress.

Oil of Origanum.

Several species of *Origanum* grown in Mediterranean countries yield origanum oil. There are two kinds of oil in the market, known respectively as Trieste oil (from *Origanum hirtum*) and Smyrna oil (from *O. Smyrnaeum*). Oil of sweet marjoram is yielded by *O. Marjorana*.

It will be seen from the following extract from the *Board of Trade Journal* that efforts are being made to establish an industry in this product in Cyprus:—

According to the *Annual Report* for 1905-6 on Cyprus, the manufacture of origanum oil in the island, undertaken by the Agricultural Department, has during the last year assumed more important proportions, and a sample of the product was submitted to Professor Dunstan, F.R.S., of the Imperial Institute. The preliminary report made on the sample showed that the oil was of good quality and would sell readily to druggists, soap manufacturers, makers of perfumery, and dealers in essential oils, and actual sales were effected at remunerative prices.

The Agricultural Department has been carrying on the distillation of this oil for some four years, and has proved that the product is easily made, and can be profitably disposed of in a ready market. The origanum plant, from which it is made, grows freely in the forests. Permission to utilize the plant can be obtained from the Department, which is ready to withdraw from the business and to give advice and assistance to any approved person who may desire to engage in the industry.



EXPORTS OF WEST INDIAN COTTON.

The following is a statement (furnished by the Customs Department in each case) showing the amount and estimated value of Sea Island cotton exported from the various West India Islands during the *quarter* ended September 30, 1906:—

Island.	Bales.	Weight in pounds.	Estimated value.
Barbados ...	89*	39,004	£1,950
Antigua ...	93	16,010	801
Nevis ...	47	8,397	420
St. Kitt's ...	10	2,050	103
Anguilla ...	5	1,050	53
Grenada			
(Marie Galante)	25	7,440	372
St. Vincent ...	1	360	18
St. Lucia ...	1	200	10
Trinidad and Tobago			
(Marie Galante)		1,600	40
British Guiana	—	—	—
Montserrat ...	—	—	—
Virgin Islands	4	800	40
Jamaica ...	14	1,846	92
Total ...	289	78,757	£3,899

* 1 Bag.

The returns for the previous quarter were published in the *Agricultural News* (Vol. V, p. 214).

SEA ISLAND COTTON MARKET.

The 'Sea Island Cotton Report' of Messrs. Henry W. Frost & Co., of Charleston and Savannah, dated December 1, 1906, has the following reference to Islands cotton:—

We have had again this week an active and advancing market for the limited offerings of odd bags, and as the supply fails to satisfy the demand, the factors readily obtained a further advance of 1c., and have not only sold, but have contracted ahead in a limited way for all the receipts on a basis of fine at 31c.; fully fine at 33c.; extra fine at 35c. to 36c.

At the close of the market the factors refused to contract further ahead for future receipts on a basis of 1c. advance, preferring to delay selling until they accumulated some stock; consequently, to-day there is absolutely no stock for sale, except planters' crop lots.

COTTON SEED SELECTION.

Arrangements have been made to extend the seed selection experiments in Barbados this year. Twelve estates have been chosen for this work, every cotton-growing district in the island being represented. It is expected, as a result of this distribution, that plants will be produced acclimatized to all the conditions found in the island.

The selection is being carried out on similar lines to last year's work, the best plants being first selected in the field, and afterwards the seed will be obtained from those which have produced the finest lint. The selection of plants in the field has already been commenced.

On those estates where seed selection was carried on last year, the plants will this year be selected from the nurseries in which last year's selected seed was sown.

In St. Vincent, seed selection experiments have also been commenced this year. Plants have been selected on a number of estates which are fairly representative of the general conditions of the island.

It is interesting to note, in connexion with this work, that the subject of cotton seed selection has been seriously taken up in Egypt. Mr. G. P. Foaden, B.Sc., has written an interesting article in the *Yearbook* of the Khedivial Agricultural Society, just issued, in which he encourages a system of seed selection in that country, based on the method adopted in America. This is the system that is being carried out by the Imperial Department of Agriculture in the West Indies.

COTTON PROSPECTS AT ST. KITT'S.

Mr. F. R. Shepherd, Agricultural Superintendent at St. Kitt's, has forwarded the following brief report on the prospects of the cotton industry in that island:—

The early planted cotton is now fast ripening up, and picking, with large gangs, is being pushed on everywhere. Owing to the excessive rain and abnormally high winds that have prevailed, some of the young bolls have been destroyed, but, on the whole, the prospects of a good return are very encouraging. The ginneries are all at work, and some 28 bales, amounting to 10,000 lb. of lint, have been shipped from this season's cotton, and further shipments are going on.

At Spooners ginnery, an additional gin, a single-action Asa Lees, has been erected, and this ginnery is now able to turn out between 25 and 30 bales, of 400 lb. each, per week.

The ginnery at Stone Fort, worked by an aermotor, is also in operation and steps are being taken to increase its power by the addition of an oil engine. A small ginnery, consisting of a small oil engine, one single-action Asa Lees gin, and hand-baling press, has recently been erected in Basseterre by Mrs. Pistana and is working satisfactorily.

WEST INDIAN COTTON.

The following report, dated Liverpool, November 11, on West Indian cotton, has been received from Messrs. Wolstenholme and Holland:—

American Sea Island cotton continues to advance, and prices are nearly 1*d.* per lb. dearer since we last wrote on the 5th. instant, the market still being strong.

A few small parcels of Barbados cotton have been sold at 17*d.* to 18½*d.*, and Antigua at 15½*d.*

Writing on December 4, the same firm states:—

Since our last report on the 11th. ultimo, American Sea Island crop accounts continue to be more unfavourable, the latest estimates being 60,000 to 70,000 bales for the entire crop, as against 125,000 last year.

We consider this rather beneath the mark, but at the same time there is a distinct scarcity. On the other hand, spinners have fair stocks carried over from last season and can afford to await.

Quotations are 1*d.* per lb. dearer for the lower grades, and 2*d.* per lb. for the finer sorts, and we expect to obtain record prices for West Indian Sea Island this season.

COTTON PROSPECTS AT NEVIS.

Mr. F. R. Shepherd, Agricultural Superintendent at St. Kitt's, has forwarded the following note on the prospects of cotton growing in Nevis:—

I am glad to be able to report that Mr. Maloney, the Temporary Cotton Instructor sent to Nevis, has done good and useful work among the small growers, and his object-lessons in dusting the cotton plants economically and effectually have been appreciated by the larger growers. In every way, I am of opinion that his presence in Nevis has been of great benefit to the cotton industry there. In his weekly report dated November 30, he writes: 'I have visited practically all the small growers of cotton in the island, the number of whom is 338 with an area of 576 acres.'

He is now engaged in going over the same ground to find out if his instructions are being carried out, and with what success.

SEASONABLE NOTES.

On many of the cotton estates in Barbados planters will have to be turning their attention to preparation for the second crop.

The first bearing has almost all been picked from the early planted fields, and, on account of the unfavourable weather, the returns from these fields have not been as good as usual. A very large number of fields were, however, planted late, and these are giving promise of a better crop.

Now, with reference to the plants which yield the second crop, it will be useful to compare the character of the plants as they produce their first and second crops.

The plant as it produces its first crop is normally erect, with an upright primary shoot giving off more or less small lateral branches on which the bolls are produced. After the first bearing the primary stem is not so much in evidence, but large, spreading, lateral branches are produced from the bottom of this primary stem. These lateral branches are now the important parts of the plants, and if a good second crop is to be reaped, they must be well looked after. On no

account should the plants be crowded. Because of their large spreading branches, they require much more space when producing their second crop than they did when producing their first. There ought to be a space of from 5 to 6 feet between the rows. Where the seed was sown in double rows across the field, there is only about 2½ to 3 feet between the rows. This is much too close, and every other row should be taken up as soon as the first bearing has all been picked.

In cane cultivation the planter recognizes the great benefit derived by covering the ground with trash in a young cane field during the dry months, and as the cotton plant, in order to produce a second crop, has also to pass through the dry season, it would be a great advantage to adopt some method which would serve the same purpose as the trash in a cane field.

GOLD MEDALS FOR COTTON GROWERS.

The following appeared in the *St. Vincent Times*, of December 6:—

At a meeting of the Cotton Growers Association and Agricultural and Commercial Society held at the Court House yesterday, his Honour the Administrator read a letter from the Imperial Commissioner of Agriculture for the West Indies, in which Sir Daniel Morris informs the Association that the gold medals offered by Sir Alfred Jones for excellence in cotton culture were awarded to Mr. Alexander Smith, of Argyle estate, and Mr. Charles Layne, of Good Hope. His Honour, in announcing the fact, congratulated Mr. Smith, who was present, on having obtained the valued prize. In the course of his remarks Mr. Cameron referred to Mr. Smith as one of the pioneers of the cotton industry, to whose efforts the present very promising position of the industry in St. Vincent was largely due, and considered that he richly deserved the prize. Mr. Smith thanked his Honour for his very kind remarks.

In Antigua seventeen estates competed for the gold medal. After full consideration the committee appointed for the purpose advised that the medal be awarded to Gilbert's estate, 'as being in their opinion, taking into consideration both yield and price obtained, easily first. This conclusion the committee consider embodies not only their own opinion from returns submitted, but, they think, carries with it, also, the general verdict of the community, as shown by the desire at all times to purchase the cotton seed from this estate.'

In Nevis the gold medal has been awarded to Pinney's and Clark's estates, which had an area of 45 acres under cultivation, the average yield per acre being 191·2 lb., and the average price per lb. 13·39*d.*

At Barbados the Cotton Committee has recommended that the gold medal for large areas, over 10 acres, be awarded to Dr. C. E. Cooding, M.C.P., of Stirling estate, St. Philip, and the gold medal for small areas, under 10 acres, to Captain G. A. G. Lane, of Sewell estate, Christ Church.

It may be of interest to mention that it is proposed that all the gold medals referred to above shall be presented by Sir Alfred Jones, at the Planters' Hall, on the occasion of his visit to Barbados on January 8 next.

EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming, should be addressed to the Commissioner, Imperial Department of Agriculture, Barbados.

All applications for copies of the 'Agricultural News' should be addressed to the Agents, and not to the Department.

Local Agents: Messrs. Bowen & Sons, Bridgetown, Barbados. *London Agents:* Messrs. Dulau & Co., 37, Soho Square, W., and The West India Committee, 15, Seething Lane, E.C. A complete list of Agents will be found on page 3 of the cover.

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Agricultural News

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NOTES AND COMMENTS.

Contents of Present Issue.

The editorial in this issue of the *Agricultural News* deals with proposals in connexion with the West Indian Agricultural Conference to be held in Jamaica next month.

Interesting statements as to the successful cultivation of seedling canes in British Guiana and Jamaica appear on p. 403; also an account of the work of the Sugar Experiment Station in Jamaica.

The Pine-apple and the Valencia varieties of oranges have, so far, given the best results in Cuba; and of grape fruit, Marsh's Seedless and Duncan. (p. 404.)

On p. 405 will be found a *résumé* of the paper in the last issue of the *West Indian Bulletin* on the cultivation of capsicums or chillies.

Several notes of interest to cotton growers, including a statement showing the amount of cotton exported from the West India Islands during the quarter ended September 30 last, are given on pp. 406-7.

An article on the cultivation of rice appears on p. 411.

As previously mentioned in the *Agricultural News*, a successful Rubber Exhibition was recently held in Ceylon. The official report on p. 414 contains a statement of some of the principal points brought out by the Exhibition.

Agricultural News.

With this issue the fifth volume of the *Agricultural News* is brought to a conclusion.

The index and title page to this volume is in course of preparation and will be issued as soon as possible.

Lectures to Sugar Planters.

A summary has just been published of seven lectures to sugar planters, which were delivered by the officers of the Imperial Department of Agriculture at Barbados about four years ago.

For various reasons the publication of these Lectures had to be postponed to a later period than was once proposed, but little or nothing has been lost by such a course. They will, in their completed form, prove of special interest in connexion with the further efforts about to be made for improving the sugar industry in these colonies and reducing the cost of production of sugar so as to place the West Indies in a favourable position to compete with other countries.

The following quotation may be made from the preface to this publication: 'During the period that has elapsed since the Lectures were delivered there is evidence that there has been a perceptible improvement in agricultural methods. A deeper interest has also been taken in the selection and use of manures, with the result that the money spent, especially on artificial manures, has brought a larger return. In fact, many of the problems of which mention is made in the Lectures are now in a fair way of being solved.'

It may be mentioned that the first lecture of the course was delivered by Sir Daniel Morris, who dealt with the 'Natural History of the Sugar-cane.' The remaining lectures were delivered by Professor J. P. d'Albuquerque, Mr. J. R. Bovell, Mr. H. Maxwell-Lefroy, and Mr. A. Howard.

The price of the Lectures, which are published by Messrs. Dulau & Co., 37, Soho Square, London, W., is 1s. They can be obtained through the agents for the sale of the Department's publications.

Rubber in Southern Nigeria.

According to the *Annual Colonial Report* on Southern Nigeria (Lagos) for 1905, the Para rubber tree appears to be well suited to the climate of the littoral districts, and considerable efforts were made to bring its value to the notice of the planting community.

Over 5,000 seeds were imported from the Straits Settlements, and these, together with a like number obtained locally, have formed the nucleus of Government plantations and for the distribution of seedlings to the general public. A much larger number will be imported this year.

The cultivation of *Castilloa elastica* has proved a failure, owing to the attacks of a boring beetle, *Inesida leprosa*. *Ficus elastica* has done excellently at Olokemeji, and plants have been distributed to planters. Its cultivation will be greatly extended. From the Botanic Gardens 2,700 plants of *Funtumia elastica* were distributed.

Exports of St. Lucia.

The report of the Treasurer for the year 1905-6 states that the total value of the exports of St. Lucia, exclusive of bunker coal, was £109,028, an increase of £7,578 as compared with the previous year.

The value of the sugar exported (4,513 tons) was £42,754, against £40,100 (4,607 tons) in 1904-5. The output of cacao was 845 tons (value, £38,041), as against 604 tons (value, £29,007).

The products of the colony exported to the British colonies during the year amounted in value to £8,258; of this amount Barbados received produce to the value of £2,057, the principal items being molasses, wood, mangos (£408), and cacao.

Banana Fibre in Jamaica.

It is stated in the report on the Government Laboratory in Jamaica, for 1905-6, that a banana fibre company is commencing operations in the parish of St. Mary. Steps were taken during the year to ascertain what loss the planters would sustain by selling the banana stems to the company instead of returning them to the soil. To estimate their manurial value, analyses were made of stems in various stages.

As a result, Mr. Cousins estimates that the manurial value of 300 stems from an acre of land is about £2. Potash was the most important item, viz., 180 lb. per acre, the losses of phosphates and nitrogen being small in comparison. On some lands the loss of humus resulting from the removal of the stems would seriously affect the productive power for bananas, especially when a spell of drought occurs.

Mr. Cousins concludes: 'If a good yield of commercial fibre can be obtained, the industry should be a sound one; on the other hand, a low yield of inferior fibre would prevent the factory from paying a price for the stems adequate to their agricultural value to the planter.'

Exports of Trinidad.

The *Annual Colonial Report* on Trinidad for 1905-6 states that the sugar crop of 1905 was a very good one — on many estates the largest on record. Low prices, however, discounted the heavy return of produce, most of which was not shipped until after the close of the financial year. The number of tons actually exported was less than in the previous year, the figures being 36,241 tons (£452,866), as against 47,578 tons (£723,048) shipped in 1904-5. The value of sugar exported was thus £270,000 less than in 1904-5.

The cacao crop was also a very fine one, the value of the exports being £1,196,450, as compared with £1,053,880 for the previous year. The total amount of cacao produced in Trinidad was 432,288 cwt., as compared with 363,873 cwt. in 1904-5. As in the case of sugar, however, the prices obtained were low.

The number of cocoa-nuts shipped during the year was 483,363 greater than in 1904-5, the value being £29,228, as against £21,832. There was an increase of £37,000 in the value of the balata gum exported.

Exports of Grenada.

The *Annual Colonial Report* on Grenada for 1905 states that the trade of the colony experienced a sharp recoil from the satisfactory conditions of the previous year. The value of the exports fell from £321,766 to £283,955. The principal cause of this was the unexpected collapse of the crop of the chief staple, cacao (which contributed 85 per cent. of the exports), both in quantity and prices. The crop for the year ended September 30, 1905, was only 64,319 bags (of about 180 lb.), as compared with a record crop of 67,225 bags in the preceding year. This shortage was probably due to unequal incidence of rainfall. Further, prices were unsatisfactory on account of the largely increased influx of West African cacao into the market. The value of the exports of cacao was £243,790, as against £272,226 in 1904.

The spice crop was satisfactory in quantity but not in pecuniary result. The value of the exports fell from £33,767 in 1904 to £27,992 in 1905.

The other leading product of the colony is cotton, the growth of which is practically confined to Carriacou, where there is a hopeful future for it. In consequence of unfavourable weather, the steady increase of the output, which had obtained up to the end of 1904, was rudely interrupted in 1905, when only 1,899 cwt. of raw cotton and 4,849 cwt. of seed were exported, as compared with 2,807 cwt. and 6,844 cwt., respectively, in the preceding year.

Agriculture in British Central Africa.

According to the *Annual Colonial Report* for 1905-6, has always been in British Central Africa a fluctuating export; 773,919 lb. were exported in the year under review.

The amount of cotton exported is increasing every year. In 1901-2 experimental shipments were made. In 1902-3, 692 lb. were shipped; in 1903-4, 26,577 lb.; in 1904-5, 285,185 lb.; and in 1905-6, 776,621 lb. The cotton is mostly Egyptian and American Upland. Sea Island does not succeed. The average price is 7d. to 9d. per lb. The yield varies on the estates from less than 100 lb. to 320 lb. (in some small areas) of lint per acre. A greatly increased output is predicted, if there is no fall in prices. The natives are taking up the cultivation of cotton for themselves in increasing numbers. In 1905, 22 tons of selected Egyptian and American seed were distributed to the natives by the British Cotton-growing Association and the Government.

The amount of tobacco grown this year (198,994 lb.) is nearly quadruple that in the year before. Most of it is exported to the Transvaal.

The export of chillies has decreased since cotton, tobacco, and food stuffs have been found more profitable; 20,291 lb. were exported.

Of rubber, 852½ acres, mostly *Landolphia* and *Manihot*, have been planted in all; but only 523 lb. were exported from plantations last year, while the wild rubber collected was 16,758 lb. Mauritius and sisal hemp are being planted on an estate scale.



INSECT NOTES.

Larger Moth Borer of the Sugar-cane.

Accounts of the larger moth borer of the sugar-cane (*Castnia licus*) have been published in previous numbers of the *Agricultural News* (Vol. III, p. 426, and Vol. IV, p. 26), and in the *West Indian Bulletin* (Vol. VI, pp. 41-7).

This insect appeared as a pest of cane at plantation Enmore in British Guiana in 1904, where it was the cause of a considerable amount of damage.

Previous to that time, little was known as to its habits. It was recorded as occurring throughout Central America, in South America, and in Trinidad. The recorded food plants were species of *Orchidaceae* and *Bromeliaceae*, in South America, while it had been known as a borer in the banana in Trinidad. Mr. O. W. Barrett, late Entomologist and Pathologist at the Porto Rico Experiment Station, writing to the Entomologist on the staff of the Imperial Department of Agriculture, stated that he had known *Castnia licus* in Mexico, but not as a pest of cultivated plants.

Castnia licus has recently been reported as attacking canes in Trinidad in connexion with the outbreak of the frog-hopper (*Tomaspis* sp.) recently recorded in the *Agricultural News* (Vol. V, p. 330).

Bulletin 54 of the Bureau of Entomology, U. S. Department of Agriculture, gives an account of *Castnia licus* under the title 'Giant Sugar-cane Borer,' with illustrations of the insect in its different stages.

The occurrence of *Castnia licus* as a borer of canes in Trinidad may indicate that it is travelling northward, with a chance that it will later become distributed in the islands of the Lesser Antilles. The moth borer (*Diatraea saccharalis*) was first described from South America, and is now known as a pest in the United States, having travelled northward through these islands. If *Castnia licus* can breed as far north as Mexico, it should have no difficulty in living and reproducing in these islands.

This possibility would seem to furnish a strong argument in favour of extreme strictness in importing cane plants from localities where *Castnia licus* occurs into those where it does not.

Insects from Montserrat.

Mr. W. Robson, Curator of the Botanic Station, Montserrat, forwarding two species of insects to the Imperial Commissioner of Agriculture, writes:—

'No. 1 is found on the French guava (*Cassia occidentalis*), to which it is apparently attracted by the honey dew or other secretion from the leaves and seed-pods, and does not seem to damage the plant in any way.'

This insect is a beetle of the family Lampyridae to which many of the smaller fire-flies belong. The Lampyridae are mostly small or medium-sized insects, with soft bodies, and long, saw-like antennae. The species from Montserrat is of a bright brick-red colour on the prothorax, basal half of the

wing-covers and the basal half of the femora, while the head, antennae, apical half of wing-covers, and legs, except the basal half of the femora, are all of a metallic blue, brighter on the wing-covers than on the legs. The thorax and abdomen have the red colouration except the last segment of the abdomen, which is blue. The beetle is about $\frac{1}{2}$ inch in length and the antennae are about the same length.

This is a very handsome and showy insect, and is probably not a pest to agriculture.

Mr. Robson states that no. 2 is found on the French cotton (*Calotropis procera*), but he is not able to say whether it does any damage.

This is *Oncopeltus fasciatus*, an insect which has previously been recorded from St. Lucia and Dominica, and in a recent note in the *Agricultural News* (Vol. V, p. 378) was reported as having been identified from British Guiana, where its food plant is given as the wild ipecacuanha (*Asclepias curassavica*). Although somewhat resembling the cotton stainers in general appearance, it is not very closely related, belonging as it does to the family Lygaeidae.

CASSAVA STARCH IN JAMAICA.

In the report on the Government Laboratory in Jamaica, Mr. H. H. Cousins, M. A., makes the following reference to the prospects of the cassava starch industry in that colony:—

This Department has now been studying the possibilities of the cassava as a starch producer for three years, and it has been proved that this plant is capable of giving enormous yields of starch upon soils in dry districts that would not grow other crops for export.

The starch content of the tubers fluctuates with the vegetative condition of the plant, and great variations have been found between the yield and maturation of the different varieties.

Two starch factories are now in operation, and it is hoped that a valuable and stable industry may be added to the resources of the colony, and this without displacing a ton of sugar, a bunch of bananas, or a pound of any other article of export. It is manifest that the success of the cassava starch industry would be a direct gain and serve to bring into profitable cultivation large tracts of land in the zone of light rainfall at present of very small agricultural value.

CARRIACOU LAND SETTLEMENT SCHEME.

Particulars as to the Land Settlement Scheme in Carriacou were given in the *Agricultural News* (Vol. IV, p. 57). The position and results of the scheme are reviewed in the *Annual Colonial Report* on Grenada for 1906, with the following conclusions:—

It is not too much to claim for the scheme that it has infused new life into Carriacou, which for too many long years had suffered through the absence of proprietors and the collapse of the sugar industry. It has now an assured future, in which the cotton and lime industries are bound to play an important part, and if capital were available to develop some of the larger estates side by side with the peasant proprietors' cultivation, Carriacou might become one of the most prosperous of the minor British possessions in the West Indies.

The success of this scheme of land settlement has been so great, and its beneficial results are already so marked, as to encourage the hope of similar developments in the future, both in Carriacou and elsewhere in these islands.



RICE CULTIVATION.

Tropical Life, for November, has the following article, entitled 'How to succeed with rice cultivation—transplant your paddy,' which contains much useful information:—

Having been present at the West India Committee Rooms, when the Governor of British Guiana, Sir Frederic Hodgson, spoke of the important development of the rice industry in that colony, we have much pleasure in calling the attention of our readers in that colony and elsewhere to the following advice on the subject, issued by Mr. C. Dreeberg, Superintendent of School Gardens, at Colombia, Ceylon.

Ordinarily, Mr. Dreeberg tells us, paddy is sown broadcast; sometimes it is dibbled in soon after germination; while sometimes transplanting (i.e., first raising seedlings in a nursery and then planting out) is carried on.

In the experiments initiated by the late Mr. H. W. Green, through his Agricultural Instructors, between 1885 and 1895, the advantages of transplanting in paddy cultivation (which is practised in the Kandyan districts and carried on with the best results in Japan) were pretty clearly demonstrated, and these advantages may be summed up as follows:—

- (1) There is an enormous saving in seed-paddy.
- (2) The weeding of the field is much easier.
- (3) The growth of the crop is more luxuriant, and the yield consequently larger.

Why, then, it will be asked, is not transplanting generally practised? The following are the objections that have been brought forward against the system:—

- (1) It is not suitable for very wet lands.
- (2) It entails an enormous amount of labour in large fields, which it is difficult to command.
- (3) It takes up a great deal of time.
- (4) The nursery is difficult to protect.
- (5) The plants take a somewhat longer time to ear.

In transplanting, the number of seedlings put into one place may vary. It is usual to pull up and plant half a dozen or more together, but it has been found that the individual plants develop all the better the less the number put down in one place; and this we would expect to be the case from analogy—comparing paddy growing with the planting of larger forms of vegetation—whether tea, rubber, or cocoa-nuts.

The number of single seedlings required to plant an acre, 9 inches by 9 inches, is 77,450. Now, 2 measures of paddy will be found to contain (according to size of grain) from 75,000 to 150,000 seeds, so that, making allowance for failures from various causes, 2 to 2½ measures sown in a nursery ought to suffice to plant out an acre of single seedlings 9 inches by 9 inches. The average number of tillers or shoots from a single transplanted seedling may be as many as thirty to forty (in Japan the number is said to be seventy to eighty), while not more than ten or twelve flowering stems are found to emerge from each 'tuft' or transplanted seedlings.

Experiments in India have shown that an acre planted 9 inches by 9 inches, with single seedlings, may produce practically double the quantity yielded by the usual 'bunching' method of transplanting.

These are facts well worth thinking over, and the object of these notes is to induce members of the society, particularly

those belonging to the rural branches of it, to put this system of planting out single seedlings to the test and ascertain for themselves its practicability and economy under varying conditions. The saving in seed-paddy is not too insignificant a matter for consideration, while the prospect of a bigger harvest with a smaller sowing—paradoxical though it may appear—is surely encouraging. As already indicated, the system is founded on a sound agricultural principle, and has proved eminently successful in Japan, Java, and India; and one would be justified in advising cultivators to adopt it wherever practicable; it is its practicability, as regards time, labour, expense, and local conditions generally, that has to be tested. There is no doubt whatever that transplanting is particularly well adapted for small fields that are not too swampy.

It is pointed out (in the *Queensland Agricultural Journal*) that rice can be profitably grown on the coast lands of Queensland, yet, despite the profitable nature of the industry, as exemplified at Pimpama in the south and at Cairns in the north, Queensland farmers do not seem to take any interest in rice production. In the United States, however, the farmers grow immense quantities of rice. True, they employ Japanese labourers on the swampy coast lands, but in this state we grew mountain rice by white labour. It sold at 6s. per bushel, and the average crop was 40 bushels per acre, and, under favourable circumstances, 60 bushels. Yet Queensland imports all the rice she needs, whilst producing maize at 2s. 6d. and 3s. per bushel.

His Majesty's Consul at Galveston reports that in the cultivation of rice, the Carolinas and Georgia have of late been completely overshadowed by the newer fields of Louisiana and Texas. The swampy lands on the coast of the Gulf of Mexico in these two states have been found to be peculiarly suited to the growth of rice, and land that was a few years ago thought to be almost valueless is now sold at high prices. Additional impulse has been lent to the industry by the presence of several colonies of Japanese, skilled rice cultivators, and more of them are expected. There are already several hundred of these Japanese. The progress of the rice industry in Texas can readily be seen when it is stated that in the report issued by the Secretary of Agriculture at Washington in December last, out of a total of 460,198 acres under rice cultivation in the United States in 1905, no less than 432,286 acres were in Louisiana and Texas; 237,900 acres in the former and 194,386 acres in the latter. Texas produced 6,025,966 bushels, of an average value of \$1 per bushel; and Louisiana 6,137,820 bushels, of an average value of 89c. per bushel. As yet, however, there is comparatively little rice exported from Texas, the bulk being grown for home consumption.

THOROUGHbred STALLION FOR ST. VINCENT.

The Imperial Department of Agriculture has recently imported a fine stud horse, 'Beau II,' obtained through the Government of Canada. The animal is an English-bred Stallion, dark bay, with black points, standing 16 hands, and has an excellent pedigree; he is by 'Orville' out of 'Flirt' and has 'Ormond,' 'Bend Or,' and 'Hermit' blood in him. After remaining a short time at Barbados, 'Beau II' will be shipped to St. Vincent to be attached to the Stud Farm in that island. As previously mentioned in the *Agricultural News*, a few months ago a fine donkey stallion and a pedigree Ayrshire bull were obtained by the Department and attached to the same farm. These are likely to be of great service to the island.



GLEANINGS.

The twenty-fifth annual sale of Government Farm Stock will be held at Valsayn, St. Joseph, Trinidad, on Wednesday, January 23, 1907.

The treasury returns of Dominica show that 598 cwt. of citrate of lime, valued at £1,255, had been exported from that island up to November 30 last.

In Malta there were 688 acres of land under cotton in the year 1905-6, as against 587 acres in 1904-5. The produce in lint last year was estimated at 162,448 lb. (*Annual Report*.)

Mr. A. C. Seward, F.R.S., has been appointed Professor of Botany in the University of Cambridge in succession to the late Professor Marshall Ward.

Professor R. W. Boyce, F.R.S., of the Liverpool School of Pathology, was among the recipients of the honour of knighthood on the occasion of His Majesty's sixty-fifth Birthday.

Those portions of the Pamphlet No. 38, issued by the Imperial Department of Agriculture, entitled *Cultivation and Curing of Tobacco*, which dealt with the growing of tobacco under shade, have been reprinted as Pamphlet No. 19 of the Department of Agriculture for British East Africa.

According to the *Consular Report* on the foreign trade of France for 1905, there was an increase of £672,000 in the value of the imports of coffee as compared with the previous year. There was a slight increase in the value of cacao and French colonial sugar, also in tobacco (raw and manufactured).

His Majesty's Consul at Chicago (Mr. A. Finn) reports that there has been an alarming increase in the district affected by the cotton boll weevil, and that it is stated to have penetrated about 50 miles into the cotton district of the Indian territory. (*Board of Trade Journal*.)

The quantity of oranges, lemons, and mandarins produced in Malta during the year 1905-6 was about 184,050 dozen, showing an advance of 2,704 dozen on the previous year's crop. The Washington Navel variety is being cultivated at the public gardens at Sant' Antonio. (*Annual Colonial Report*.)

A report on the 'Present Position and Prospects of the Agricultural Resources of the Island of St. Helena,' which was written by Mr. Morris (now Sir D. Morris, K.C.M.C., Imperial Commissioner of Agriculture for the West Indies) in January 1884, has, in consequence of many requests for copies, been re-issued as *Colonial Reports—Miscellaneous*, No. 38.

The exports from Barbados to British North America have shown a steady increase during the last few years; the values are as follows: 1902, £122,273; 1903, £135,456; 1904, £249,000; 1905, £276,095. The value of the imports into Barbados from British North America was £83,581, as against £75,749 in 1904. (*Annual Colonial Report*.)

In reference to the two fine Indian goats of the Zaraibi breed, of whose importation from the Punjab by the Imperial Department of Agriculture mention has already been made in the *Agricultural News* (Vol. V, p. 184), it may be of interest to state that one of them stands 36½ inches at the shoulder and weighs about 163 lb.

Arrangements have been made for five Cantor Lectures to be given at the Society of Arts on 'Artificial Fertilizers,' by Mr. A. D. Hall, M.A., Director of the Lawes Agricultural Trust at Rothamsted. The lectures deal with the Nutrition of the Plant, the Fixation of Nitrogen, Nitrogenous and Phosphatic Fertilizers.

The Trinidad *Mirror*, for November 10, reports on the annual schools' show at Tobago. Exhibits from the Botanic Station, schools' vegetables, needlework, etc., were on show and there was a peasant proprietors' section. The exhibits in the last-named section were rather disappointing, nor did those in the schools' section come up to those of 1905.

In the report of the Secretary, Minister of Agriculture in Natal, for the year ended June 30 last, it is stated that cotton 'is again being experimentally grown in Natal, with what appears to be satisfactory results. Cotton of a good fibre, and realizing a fair price, has been sent home in small quantities as samples; but it still remains to be seen whether the adverse conditions of insect pests, climate, and labour will permit of it developing into a staple industry.'

According to the Demerara *Argosy*, of December 1, Dr. Bovallius, the Manager of the Essequibo Exploration Company, has returned to the colony after an absence of some months in England. The increased capital needed has been readily forthcoming, and in addition to the exploitation of wild rubber and balata within their concession, the company has determined on the planting of rubber trees on a large scale.

It is stated in the *Annual Colonial Report* on Barbados, that the average rainfall for the island in 1905, from 197 stations, was 54.59 inches, as compared with 59.38 inches from 199 stations in the previous year. Owing to the decrease in the rainfall during the past two years, there has been a great diminution in the amount of water stored in the coral rock which covers the greater part of Barbados. The plane of saturation has been lowered, and the flow of the springs reduced.

A despatch has been received, through the Foreign Office, containing a note from the Egyptian Irrigation Department with regard to the Nile flood, from which it appears that the supply of water has been satisfactory, and that a cotton crop larger than any recorded is anticipated. The flood has been satisfactory for the irrigation of the basin lands in Upper Egypt, and, at the same time, the levels in Lower Egypt have been suitable for passing away the flood without endangering the Nile banks. (*Board of Trade Journal*.)



JAMAICA: REPORT ON THE GOVERNMENT LABORATORY FOR 1905-6. By H. H. Cousins, M.A., F.C.S.

During the period covered by this report 1,213 samples were dealt with; of these 102 were official; 193, agricultural; 49, general; while 869 were for the Sugar Experiment Station.

Sixty-six soils were analysed, and in each case a certain line of treatment was deduced. A report was issued, in conjunction with Mr. Cradwick, upon the soils of St. Mary and Upper Clarendon. Analyses of native food stuffs brought out the superior quality of native maize as regards albuminoids in comparison with the imported maize.

Reference is made to the work of the Sugar Experiment Station, as also to certain other interesting points in this report, elsewhere in these columns.

In connexion with agricultural education, it is mentioned that thirteen students attended the course of study in agricultural science during the year. A special course for distillers was held in August. The work of the Lecturer in Agriculture in connexion with the training of teachers is also reported upon.

BRITISH GUIANA: REPORT OF THE GOVERNMENT ANALYST FOR 1905-6. By J. B. Harrison, C.M.G., M.A., F.I.C., F.G.S.

During the year under review 5,488 samples were received at the Government Laboratory for examination. Of these, 2,071 were sent in by the Comptroller of Customs, 764 by the Inspector General of Police, and 583 by the Board of Agriculture.

In connexion with the examination of articles of food and drink, reference is made to the large proportion of samples of adulterated milk. The infliction of heavy fines for the sale of adulterated milk by the Georgetown Magistrates has had the effect of lowering the exceptionally high rates reported in the previous year.

Reference was made in the last issue of the *Agricultural News* (p. 326) to the analyses of sugar-cane and its products.

DEPARTMENT NEWS.

The Imperial Commissioner of Agriculture and the scientific staff of the Imperial Department of Agriculture will be away from headquarters from January 8 to 20, 1907, attending the West Indian Agricultural Conference at Jamaica.

The Hon. Dr. Francis Watts, C.M.G., Superintendent of Agriculture for the Leeward Islands, returned from leave of absence in R. M. S. 'Magdalena' on December 11. After remaining at Barbados in connexion with official business at the Head Office, Dr. Watts embarked in S. S. 'Oruro' for Antigua on December 15.

BOTANICAL INVESTIGATIONS IN JAMAICA.

The November issue of the *Journal of the New York Botanical Garden* contains an account by the Director (Dr. N. L. Britton) of a plant-collecting expedition, which visited Jamaica in September 1906.

The unexplored parts of the Cockpit country in the west-central district of Jamaica and the John Crow Mountains at the eastern end were to be explored. The expedition, guided by the Superintendent of Hope Gardens, spent a week at the eastern edge of the Cockpit country. The region is one of porous limestone, about 2,000 feet above sea-level, sparsely populated, and travelling is difficult and slow. Complete exploration of the district would require a pack-train and camp outfit. Many novelties and new species were found, however. Dr. Britton hopes that a complete investigation may be made before the cutting down of timber has altered the flora.

A week was spent in the higher portions of the Blue Mountains, at Cinchona, the New York Botanical Garden's tropical laboratory. A path led to an elevation of 7,000 feet. Here rare mosses and liverworts were found.

For three days the expedition went to Hollymount, in the centre of the island, where collections were made and near which cacti were found. A special study was made of Jamaica palms. The tallest palm native to the island is the cabbage palm (*Oreodoxa oleracea*), the royal palm (*Oreodoxa regia*) not growing wild, although it is much planted for ornamental purposes. Several days were spent at Hope, studying the plantations and herbarium. Castleton Gardens in the wet region, near the centre of the island, were also visited. Of these gardens Dr. Britton says: 'A very notable collection of economic tropical trees from all parts of the world has been brought together here, including, probably, the most complete series of palms to be found anywhere in America, all in fine condition.' The collections of prepared specimens and of living plants made during the expedition aggregate some 5,000 specimens.

GUAYULE RUBBER.

Considerable interest has of late been attracted to what is known as 'Guayule' rubber in Mexico. The following information in regard to this plant is extracted from an article in the *Tropenpflanzer*, for May 1905:—

The 'Guayule' (*Parthenium argentatum*) is a low perennial composite about 2 feet high, with grey bark, silvery leaves, and inconspicuous yellowish flower-heads on long stalks. It is widely spread along the dry calcareous steppes of the northern part of the high plateaux of Mexico, at an elevation of 2,800 to 5,200 feet.

This plant yields no latex when wounded, but the caoutchouc is in closed cells in the bark and the wood. To extract the rubber, the whole plant is dried, ground up, and as much of the woody matter as possible removed from the small round lumps of rubber which result from the grinding. The rest of the woody matter is then dissolved with hot alkali, and the rubber pressed into large, flat cakes.

The product contains as much as 10 to 27 per cent. of resins and aromatic substances, and has sold for 1s. 5d. to 2s. 4d. per lb. One factory is now working, and four others are planned. It is estimated that the plants growing wild contain about 30,000 tons of this rubber, which will supply the factories for some years. Some 7 to 12 per cent. of impure rubber can be obtained from the plant.

THE CEYLON RUBBER EXHIBITION, 1906.

The following brief account of the Ceylon Rubber Exhibition, which was referred to in the *Agricultural News* (Vol. V, p. 377), has been forwarded for publication by Dr. J. C. Willis, Director, Royal Botanic Gardens, Ceylon:—

An extremely successful Exhibition of Rubber has lately been held (September 13-27) in the Royal Botanic Gardens at Peradeniya, Ceylon, and marks a distinct stage in the progress of this great new industry, an industry which owes its inception and progress entirely to the forethought and aid of scientific men at the various Botanic Gardens of Kew, Ceylon, and Singapore.

Extensive buildings were erected in the Kandyan (or Sirhalese mountaineer) style of architecture, and were well filled with exhibits of raw rubber in its different forms from the plantations of Ceylon, the Malay Peninsula, and India, tools for the tapping and collecting of latex, manufactured rubber and rubber goods, and other things, besides exhibits of raw rubbers from all corners of the globe. Two large sheds were also filled with machinery for the treatment of the latex, and there were interesting side-shows as well.

We do not propose to go into detail as to the exhibits, but to give some of the chief facts connected with the industry, and some of the chief lessons learnt at the exhibition.

Ten years ago there was practically no rubber in cultivation of the Para kind (*Hevea brasiliensis*), the kind that is now almost exclusively attended to. Seed was then all but impossible to obtain, and though a small 'boom' in this product took place in Ceylon in 1898-9, the supply of seed was too small to allow it to go far. Only since 1902 has there been plentiful seed, and the industry has expanded very rapidly till now in Ceylon there are about 110,000 acres, in Malaya about 60,000, and in other countries probably 40,000, say, 200,000 acres in all, to say nothing of perhaps 100,000 acres of *Castilloa elastica* in Mexico.

The primitive methods of tapping the trees in V's with a hammer and chisel have now gone out, and the favourite methods are to cut spirals or herring-bones on the trees, and pare the edges of the cuts at intervals of from two to ten days, thus getting the advantage of the wound-response discovered by the writer in 1897, and worked out in detail by Mr. Parkin in Ceylon in 1898-9. The second tapping of a given area gives more latex than the first, and the amount often continues to increase for some time.

For paring the cuts there were many knives exhibited, and gold medals went to the Bowman-Northway and Miller knives, both of which are simple, keep sharp, and pare thin shavings without any dragging of the cut edges. It is very important that the shavings should be thin, as the bark should be made to last about four years before it is all cut away, in order to allow the renewed bark time to ripen fully.

The yields obtained on some estates have been phenomenal, but it is probable that in many of these cases the bark has been too rapidly cut away, and that a period of waiting for the renewed bark to ripen will ensue. It is not as yet safe to count on more than a pound a year a tree, if so much; but even this means 150 lb. to 200 lb. an acre, an amount sufficient at present prices to yield an enormous profit.

Hitherto the Ceylon rubber has mostly appeared upon the market in the form of 'biscuits'—flat pancakes about 10 inches in diameter. The Malayan has mostly been in 'sheets' about 2 feet long. But both these forms seem destined to disappear in favour of block—rubber prepared by

blocking the sheets, biscuits, or other form under high pressure. Some samples of block were shown by Lanadron estate, Johore, and similar samples have lately been getting the highest prices on the market.

The Ceylon and Malayan rubber has been obtaining higher prices per pound than any of the 'wild' rubbers, even 'fine Para' the standard of the market, but pound for pound of pure rubber is really getting lower prices, for the Para rubber contains about 20 per cent. of moisture. Why this should be so is one of the greatest problems before the investigator at the present moment.

Any one comparing a sample of fine Para with one of any plantation rubber—Ceylon, Malayan, or Mexico—can see at once that the former is more springy, returning more readily to its original shape when stretched. The higher price really obtained for this rubber may therefore probably be explained on this consideration.

Now, is it because the trees are young that the rubber is weaker, or because the rubber is not smoke-cured? Is it because the rubber is in biscuit or sheet instead of in blocks? Is it that it is too much dried (Para rubber contains 20 per cent. of moisture)? Is it that it is too pure and too much washed? Or is it that it is not coagulated in the best way? All these, singly or in combination, are possible explanations, and there may be others.

There is no doubt that older trees give stronger rubber, but that of even the oldest trees in Ceylon—thirty years old—is not equal to South American rubber. Smoke-curing (without coagulation at the same time) seems to strengthen the rubber, and block rubber, besides its saving in cost of freight, and exposure of less surface to oxidation, seems actually stronger than sheets or biscuits. The great dryness of the plantation rubber may also have something to do with it, and experiments are now being tried by the Peradeniya institution in the preparation of block from wet biscuits.

To any one looking forward a little, one of the most interesting exhibits in the show was the vulcanized and coloured rubber exhibited by Mr. M. K. Bamber, Government Chemist in Ceylon. Mr. Bamber acts, not on the coagulated and macerated rubber, but directly on the latex with the necessary reagents, and then coagulates, giving a perfect intermixture.

The coagulated rubber can then be worked up into whatever is required in the ordinary way, and finally heated, when it vulcanizes. One of the most promising of his exhibits was the mixture of fibre and rubber. The fibre, cleaned, is soaked in sulphurized rubber milk, coagulated and then dried, and finally subjected to hydraulic pressure and vulcanized, the result being blocks suitable for pavement, etc. By this method, rubber can also be turned out of any colour desired, and the colour will not wash or crack off—a great advantage for children's toys. One of the most noteworthy features of the exhibition was a series of daily lectures on the various parts of the rubber industry—cultivation, tapping, shipment to London, vulcanization, catch crops, pests, etc., etc.; and these lectures, with the reports of the judges, description of the machinery and other things, are now being put together into a book which will form a standard treatise,* to be in the hands of every one interested in rubber.

* *The Ceylon Rubber Exhibition Handbook*: by J. C. Willis, M. K. Bamber, and E. B. Denham. To be obtained about the end of the year from Messrs. Dulau & Co., 37, Soho Square, Messrs. Wyman & Sons, Ltd., Fetter Lane, London, for 7s. 6d. net.

MARKET REPORTS.

London,—December 4, 1906. Messrs. KEARTON, PIPER & Co.; Messrs. E. A. DE PASS & Co., November 30; 'THE WEST INDIA COMMITTEE CIRCULAR,' December 4; 'THE LIVERPOOL COTTON ASSOCIATION WEEKLY CIRCULAR,' November 30; and 'THE PUBLIC LEDGER,' December 1, 1906.

ALOES—Barbados, 15/- to 60/-; Curaçoa, 18/- to 55/- per cwt.

ARROWROOT—St. Vincent, 2½d. per lb.

BALATA—Sheet, 1/6 to 2/-; block, 1/6 to 1/7 per lb.

BEES'-WAX—£7 10s. to £7 15s. per cwt.

CACAO—Trinidad, 81/- to 86/- per cwt.; Grenada, 71/- to 75/- per cwt.

CARDAMOMS—Mysore, 11d. to 3/- per lb.

COFFEE—Jamaica, good ordinary, 42/- per cwt.

COTTON—Medium fine, 6·85d.; West Indian Sea Island, good medium, 16½d.; medium fine, 17½d.; fine, 19d.; extra fine, 24d. per lb. Prices paid, 5¼d. to 22d. per lb.

FRUIT—

GRAPE FRUIT—6/- to 8/- per box.

BANANAS—Jamaica, 4/- to 4/6 per bunch.

LIMES—3/- to 3/3 per box of 200.

ORANGES—10/- to 12/- per box.

PINE-APPLES—St. Michael's, 1/6 to 3/4 each.

FUSTIC—£4 5s. to £4 15s. per ton.

GINGER—Jamaica, common, 53/- to 58/-; middling to fine, 60/- to 85/- per cwt.

HONEY—Fermented to dull yellowish set, 18/- to 21/6 per cwt.

ISINGLASS—West Indian lump, 2/- to 2/4; cake, 1/1 per lb.

KOLA NUTS—2½d. to 6d. per lb.

LIME JUICE—Raw, 10d. to 1/2 per gallon; concentrated, £21 12s. 6d. per cask of 108 gallons; hand pressed, 3/6 per lb. Distilled Oil, 2/4 per lb.

LOGWOOD—£4 to £4 10s.; roots, £3 10s. to £4 per ton.

MACE—good pale, 1/6; fair to good red, 1/3 to 1/4 per lb.

NITRATE OF SODA—Agricultural, £12 12s. 6d. per ton.

NUTMEGS—68's, 11d.; 79's, 9d. to 9½d.; 94's, 8d.; 100's, 6¼d.; 113's, 6d.; 126's, 5½d.; 140's, 5d. per lb.

PIMENTO—Fair, 2½d. to 2¾d. per lb.

RUM—Jamaica, 2/3 per proof gallon.

SUGAR—Yellow crystals, 16/6 to 17/6 per cwt.; Muscovado, 14/- to 15/- per cwt.; Molasses, 11/- to 11/6 per cwt.

SULPHATE OF AMMONIA—£12 7s. 6d. per ton.

Montreal,—September 14, 1906.—Mr. J. RUSSELL MURRAY.
(In bond quotations, c. & f.)

COCOA-NUTS—Jamaica, \$26·50 to \$28·50; Trinidad, \$25·00 to \$26·00 per M.

COFFEE—Jamaica, medium, 10c. to 11c. per lb.

GINGER—Jamaica, unbleached, 16c. per lb.

MOLASCUIT—Demerara, \$1·00 per 100 lb.

MOLASSES—Barbados, 26c. to 27c.; Antigua, 21c. per Imperial gallon.

NUTMEGS—Grenada, 110's, 18c. per lb.

PIMENTO—Jamaica, 6½c. per lb.

SUGAR—Grey crystals, 96°, \$2·50 per 100 lb.

—Muscovados, 89°, \$2·00 per 100 lb.

—Molasses, 89°, \$1·75 per 100 lb.

New York,—November 30, 1906.—Messrs. GILLESPIE BROS. & Co.

CACAO—Caracas, 17c. to 19c.; Grenada, 15½c. to 16c.; Trinidad, 17c. to 18c.; Jamaica, 14½c. to 15½c. per lb.

COCOA-NUTS—Jamaica, \$33·00 to \$34·00; Trinidad, \$31·00 to \$32·00 per M.

COFFEE—Jamaica ordinary, 8¼c. to 8½c.; good ordinary, 8½c. per lb.

GINGER—Dark scraggy root, 10c. to 11c.; small to bright bold, 12c. to 14c. per lb.

GOAT SKINS—Jamaica, Antigua, and Barbados, 61c.; St. Kitt's, St. Thomas, and St. Croix, dry flint, 49c. to 51c. per lb.

GRAPE FRUIT—Jamaica, \$1·25 to \$2·00 per box.

HONEY—No quotations.

LIMES—No quotations.

MACE—33c. to 36c. per lb.

NUTMEGS—85's to 90's, 17c.; 95's to 100's, 14½c.; 105's to 110's, 13½c.; 115's to 120's, 12c.; 120's to 140's, 11c.

ORANGES—Jamaica, \$1·50 to \$2·00 per box.

PIMENTO—5c. per lb.

SUGAR—Centrifugals, 96°, 3½c.; Muscovados, 89°, 3½c.; Molasses, 89°, 3½c. per lb., duty paid.

INTER-COLONIAL MARKETS.

Barbados,—December 17, 1906.—Messrs. T. S. GARRAWAY & Co., and Messrs. JAMES A. LYNCH & Co., December 10, 1906.

ARROWROOT—St. Vincent, \$4·50 to \$5·00 per 100 lb.

CACAO—Dominica, \$12·00 per 100 lb.

COCOA-NUTS—\$12·00 per M. for husked nuts.

COFFEE—\$10·50 to \$12·00 per 100 lb.

HAY—85c. to \$1·20 per 100 lb.

MANURES—Nitrate of soda, \$65·00; Ohlendorff's dissolved guano, \$55·00; Cotton manure, \$42·00; Cacao manure, \$42·00 to \$45·00; Sulphate of ammonia, \$75·00; Sulphate of potash, \$67·00 per ton.

ONIONS—Madeira, \$4·00 to \$5·00 per 100 lb.

POTATOS, ENGLISH—Nova Scotia, \$1·80 to \$2·00 per 160 lb.

RICE—Ballam, \$6·15 per bag (190 lb.); Patna, \$3·00 to \$3·75; Rangoon, \$2·70 to \$2·75 per 100 lb.

SUGAR—No quotations.

British Guiana,—December 22, 1906.—Messrs. WIETING & RICHTER.

ARROWROOT—St. Vincent, no quotations.

BALATA—Venezuela block, 25c.; Demerara sheet, 38c. per lb.

CACAO—Native, 15c. to 16c. per lb.

CASSAVA—72c. per barrel.

CASSAVA STARCH—\$5·50 per barrel.

COCOA-NUTS—\$10·00 to \$12·00 per M.

COFFEE—14c. per lb.

DHAL—\$4·40 to \$4·50 per bag of 168 lb.

EDDOS—96c. to \$1·68 per barrel.

MOLASSES—16½c. per gallon.

ONIONS—Madeira, 4c. to 4½c. per lb.

PLANTAINS—20c. to 44c. per bunch.

POTATOS, ENGLISH—Nova Scotia, \$2·50 to \$3·00 per barrel.

POTATOS, SWEET—Barbados, \$1·68 per bag.

RICE—Ballam, \$5·90 to \$6·10 per 177 lb.; Creole, \$4·50 to \$4·75 per bag (ex store).

SPLIT PEAS—\$6·10 to \$6·20 per bag (210 lb.).

TANNIAS—\$1·68 per barrel.

YAMS—White, \$1·68; Buck, \$1·68 per bag.

SUGAR—Dark crystals, \$2·00 to \$2·10; Yellow, \$2·50 to \$2·60; White, \$3·50 to \$3·60; Molasses, \$1·40 to \$1·75 per 100 lb. (retail).

TIMBER—Greenheart, 32c. to 55c. per cubic foot.

WALLABA SHINGLES—\$3·00, \$3·75, and \$5·25 per M.

Trinidad,—December 22, 1906.—Messrs. GORDON, GRANT & Co.

CACAO—Ordinary to good red, \$19·00 to \$19·25; estates, \$19·50 to \$20·00 per fanega (110 lb.); Venezuelan, \$18·00 to \$18·50.

COCOA-NUTS—\$21·00 per M., f.o.b.

COCOA-NUT OIL—75c. per Imperial gallon (cask included).

COPRA—\$4·15 to \$4·25 per 100 lb.

DHAL—\$4·35 to \$4·40 per 2-bushel bag.

ONIONS—\$2·50 to \$3·00 per 100 lb. (retail).

POTATOS, ENGLISH—80c. to \$1·25 per 100 lb.

RICE—Yellow, \$5·50 to \$5·75; White, \$5·50 to \$5·75 per bag.

SPLIT PEAS—\$5·40 to \$5·50 per bag.

SUGAR—Grocery, \$2·25 to \$2·50; molasses, \$2·00 to \$2·25 per 100 lb.

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- | | |
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